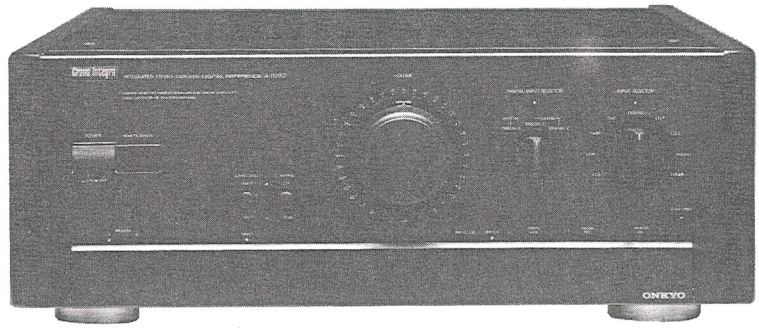
A-8990

SERIAL NO. 3313

ONKYO® SERVICE MANUAL

Grand Integra Stereo Amplifier
MODEL A-8990



SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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ONKYO AUDIO COMPONENTS

SPECIFICATIONS

POWER AMPLIFIER SECTION

Power Output:	135 watts per channel, min RMS. at 8 ohms, both channels driven from 20 Hz to 20 kHz, with no more than 0.008% Total harmonic distortion.
Dynamic Power:	460 watts 2 ohms, 310 watts 4 ohms
Total Harmonic Distortion:	0.008% at rated power 0.008% at 1 watts output
Intermodulation Distortion:	0.005% at rated power
Damping Factor:	150 at 8 ohms
Frequency Response:	CD, Tuner: 2 Hz – 50 kHz (+0, −1 dB)
Signal to Noise Ratio (IHF-A):	SOURCE DIRECT 104 dB

EQUALIZER AMPLIFIER SECTION

Phono Overload:	Phono (MM):	210 mV RMS. at 1 kHz, 0.005% THD.
	Phono (MC):	9.3 mV RMS. at 1 kHz
RIAA Deviation:	Phono (MM):	±0.2 dB. 20 Hz – 20 kHz
Signal to Noise Ratio (IHF-A):	Phono (MM):	89 dB (5 mV input)
	Phono (MC):	85 dB (0.5 mV input)
Total Harmonic Distortion (REC 3 V output) (MM):	0.003%	

D/A CONVERTER SECTION

D/A Conversion:	18 bit with eight-times over sampling
Sampling Frequency:	32, 44.1, 48 kHz
Frequency Response:	20 Hz – 20 kHz
Signal to Noise Ratio:	110 dB
Dynamic Range:	103 dB
Total Harmonic Distortion:	0.0015% (at 1 kHz)
Output level:	2 Vrms

OVERALL CHARACTERISTICS

Input Sensitivity/ Impedance:	Phono (MM):	2.5 mV/50 kohms
	Phono (MC):	110 μV/100 ohms
	CD:	150 mV/50 kohms
	Tape Play:	150 mV/50 kohms
	VCR Play:	150 mV/50 kohms
	VDP Play:	150 mV/50 kohms
	PROCESSOR IN:	150 mV/50 kohms
Output Level/Impedance:	Tape Rec:	150 mV/470 ohms (Phono)
	PROCESSOR OUT	150 mV/470 ohms (Phono)
	Pre Out:	1 V/1 kohm
Digital Input:	COAXIAL:	0.5 Vp-p/75 ohms
	OPTICAL:	−17.5~−27 dBm (Biphase)
Digital Output:	COAXIAL:	0.5 Vp-p/75 ohms
Tone Control (Vol−20 dB):	CONTRABASS:	+10 dB at 20 Hz
	BASS:	±10 dB at 20 Hz
	TREBLE:	±8 dB at 20 kHz
High Cut:	6 kHz (6 dB/Octave) (TREBLE min.)	
Muting:	−20 dB	
Power Supply:	AC 220 V, 50 Hz	
Dimensions:	477(W) × 183(H) × 453(D) mm 18-3/4" × 7-3/16" × 13/16"	
Weight:	30 kg, 66.1 lbs	

PRECAUTIONS

1. **Replacing the fuses**
   For continued protection against risk fire, replace only with same type and same rating fuse.

CIRCUIT NO.	PART NO.	DESCRIPTION
F902	252078 or	5A-SE-EAK Primary fuse
	252078CC	5A-SE-EAK Primary fuse

ADJUSTMENT PROCEDURES

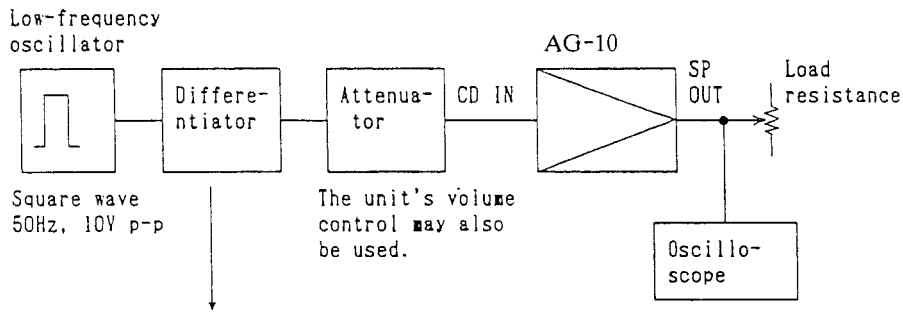
Adjustments and Checking the Protection Circuitry

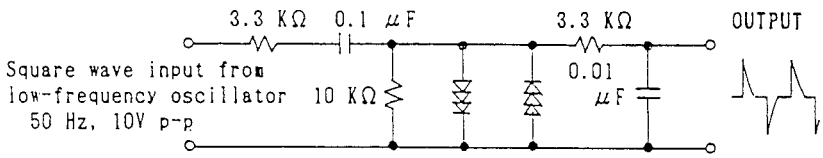
1. **Preparations**
   1) Place the unit on the workbench. (There should be about 15 mm of space between the base plate of the unit and the work surface.)
   2) Set up the unit as follows.
      (1) No load
      (2) No signal
      (3) Volume turned all the way down
      (4) Speaker switch OFF
      (5) Power switch OFF
      Note) Check the following points before making adjustments
      (1) The power switch should be OFF.
      (2) The interior of the unit should not be warm.
      (3) The DAC circuit board should be mounted correctly.

2. **Idling current adjustment**
   1) Turn the power switch ON and allow the unit to warm up for about 10 minutes.
      (1) Adjust R533 so that the voltage at test point VCT-IID on the NAAF-3199 circuit board is 15mV±5mV.

3. Check of operation of protection circuitry

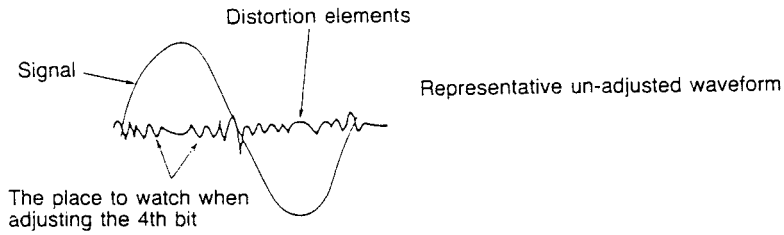
1) Check of operation of protection relay
   (1) Confirm that the relay turns ON approximately 5 seconds after the power switch is turned ON.
   (2) The indicator LED should light at the same time.
   (3) The relay should turn OFF approximately 0.5 seconds after the power switch is turned OFF.
2) Check of DC detection and servo circuitry operation
   (1) Turn the power on with no load.
   (2) After the speaker relay turns ON, apply DC+200mV to the CD-1 input terminals. Confirm that the relay turns OFF.
   (3) Confirm that operation is the same as (2) above when an input of DC−200mV is applied.
   Note) Under no circumstances connect a load or short the speaker terminals when performing the above test.
3) Signal input from the circuit illustrated below with no load.
   (1) Confirm that the speaker relay does not turn OFF even when a 2 ohm load is connected when a peak value of 45V p-p is output.
   (2) Next, confirm that when a 1 ohm load is connected the speaker relay switchse OFF and ON a couple of times and then stays OFF.
   Note) The period before that relay stays OFF should not last for more than 1 minute.
   Relay OFF status can be canceled by switching the power OFF.



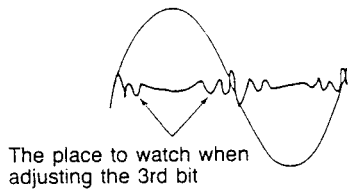


4. DAC block adjustment

1) Confirmation of digital lock indicator
   (1) Input a digital signal to one of the DIGITAL input terminals (1–3).
   (2) The indicator LED should light as follows according to the sampling frequency of the input signal.
   32kHz ..... orange
   44.1kHz ..... green
   48kHz ..... red
2) Distortion adjustment
   (1) Preparations
   ■ Connect the digital output terminal of a suitable equipped CD player to the DIGITAL 1 digital input terminal of the A-G10.
   ■ Connect a distortion meter to the analog output of circuit board NADG-3386or to the unit's analog REC OUT terminal.
   ■ Input the distortion meter signal output and the distortion output to dual-phenomenon oscilloscope.
   (2) Turn power ON to the unit.
   (3) Play track 2 of the test disc (YEDS-18).
   (4) Adjusting the 4th bit.
   Adjust semi-fixed resistor R821 (R-822) so that the non-continuous portion (difference in level) of the distortion elements shown at right is as small as possible.

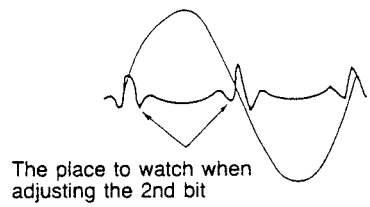


(5) Adjusting the 3rd bit.
As with (3) above, adjust semi-fixed resistor R823 (R824) so that the non-continuous portion (difference in level) of the distortion elements is as small as possible.

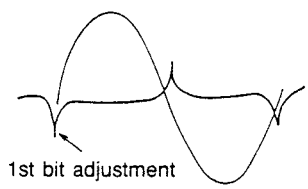


(6) Adjusting the 2nd bit.
As above, adjust semi-fixed resistor R825 (R826) so that the non-continuous portion (difference in level) of the distortion elements is as small as possible.

Note) It does not matter is up to this point the level of overall distortion is high.



(7) Adjusting the 2nd bit.
Adjust semi-fixed resister R827 (R828) so that the non-continuous portion of the final remaining distortion waveform is as small as possible.



(8) Repeat steps (4) – (7) above to fine adjust to optimum settings.

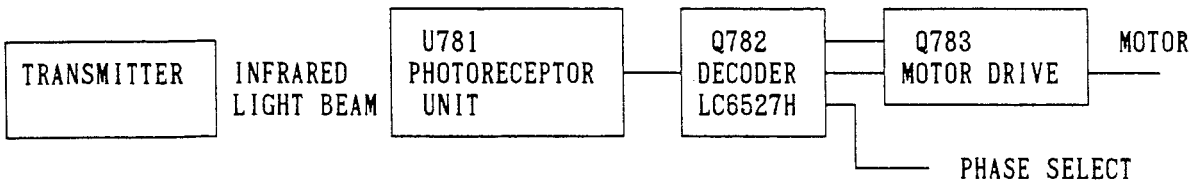
Note) The distortion meter must be accurate to 0.001% or better and possess a distortion output terminal.

Note) Semi-fixed resistors enclosed in parenthesis ( ) are for the right channel.

IC BLOCK DIAGRAM

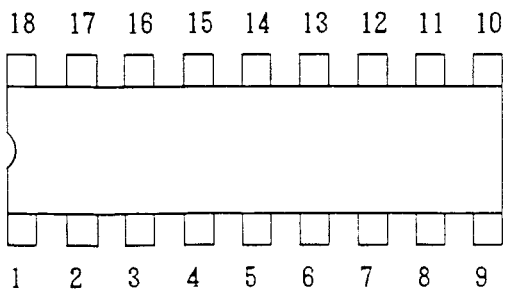
LC6527H-3722 (Infrared remote controller input system decoder)

Connections

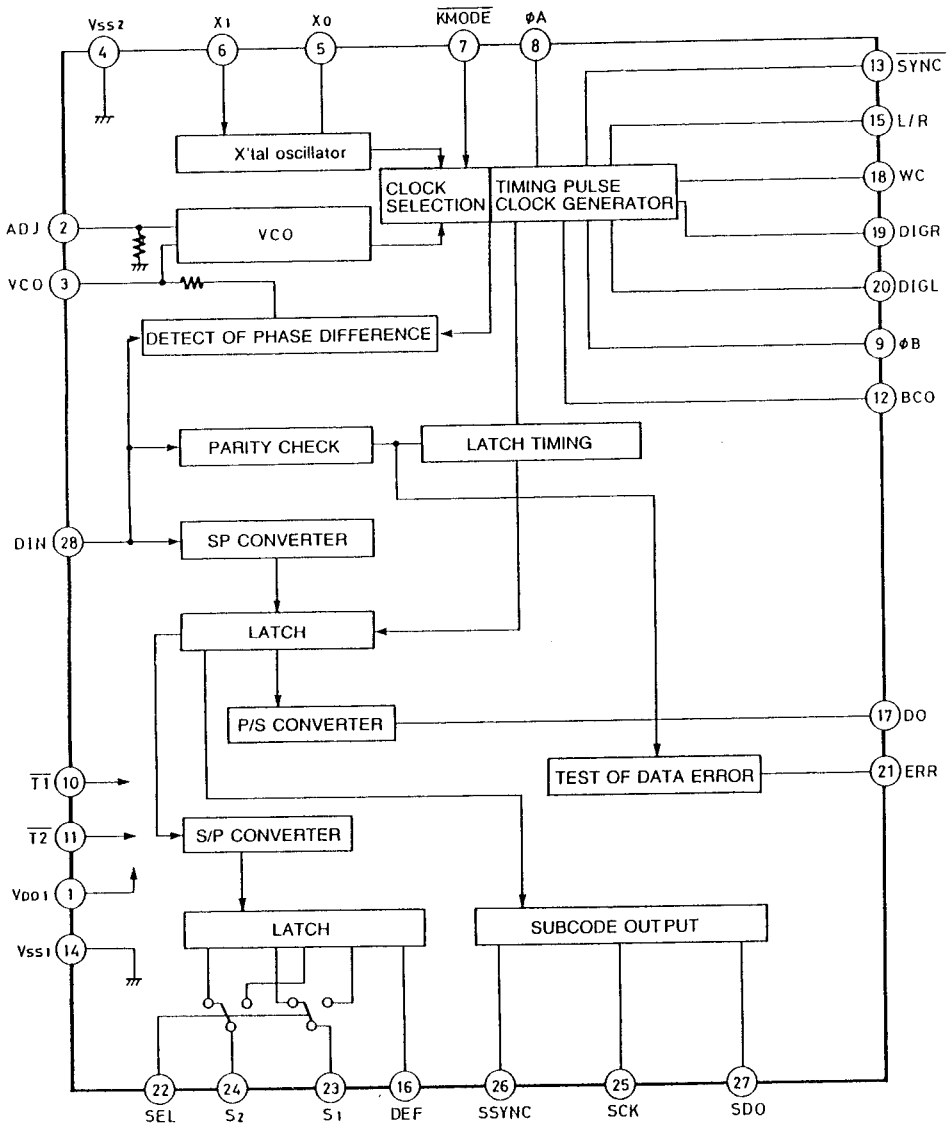


Pins

Pin No.	Pin	Function name	Function
1	OSC1	OSC	4 MHz clock input pin
2	TEST	TEST	Test pin - connect to ground
3	Vss	GND	Ground pin
4	RES	RES	Reset pin
5	PA0	NC	Leave open
6	PA1	NC	Connect to ground
7	PA2		4 MHz, 4.23 MHz select - connect to ground
8	PA3	SERIAL IN	Remote controller input
9	Vdd	+B	Connect to +5V
10 11 12 13	PC0 PC1 PC2 PC3	CUSTM	Custom code select
14	PD0	VOL DOWN	Outputs a 120mS pulse when the volume down code is input
15	PD1	VOL UP	Outputs a 120mS pulse when the volume up code is input
16	PD2	NC	(FR), leave open
17	PD3	NC	(FF), leave open
18	PH0	PHASE	Phase select



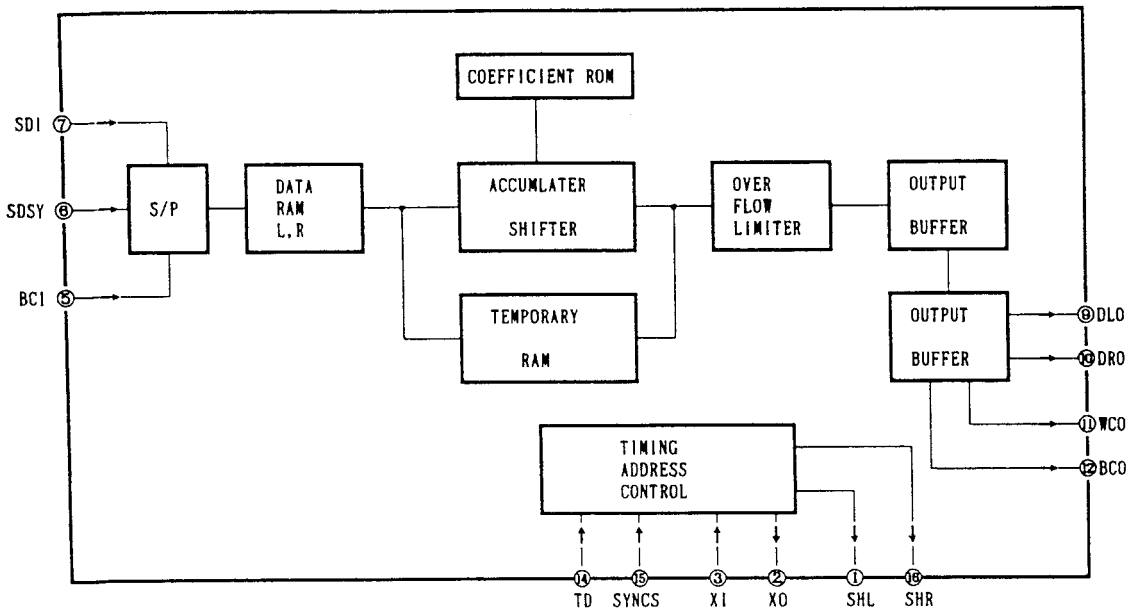
YM3623B (Digital decoder)



YM3623B (Digital decoder)

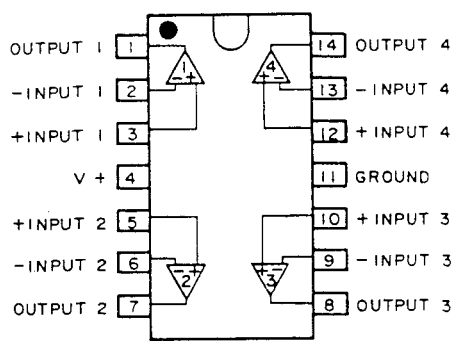
Pin No.	Pin	Function
1	VDD1	System power supply (+5V)
2	ADJ	VCO oscillation frequency adjustment pin (not connected)
3	VCO	External capacitor pin for VCO circuit
4	VSS2	VCO circuit GND. Should be converted in common with VSS1. This terminal is not common with the GND inside LSI.
5	XO	Crystal oscillator pin (18 MHz)
6	XI	Crystal oscillator pin
7	$\overline{KMODE}$	H: If there is an input at the DIN pin, it activates the PLL circuit, but if there is no input, it is activated by the crystal oscillator L: The crystal oscillator is used regardless of the voltage at the DIN terminal.
8	φA	18 MHz when the crystal oscillator is used, and varied by the DIN pin input data speed when activated by the PLL circuit. (Approx 16.9344 MHz when fs=44.1 kHz)
9	φB	1/3 of φA when the crystal oscillator is used. Varied by the DIN pin input data speed when activated by the PLL circuit. (Approx 5.6448 MHz when fs=44.1 kHz)
10	$\overline{T1}$	Internal circuit test pin
11	$\overline{T2}$	Internal circuit test pin
12	BCO	Timing clock for the signals output from the DO pin
13	$\overline{SYNC}$	Synchronizing signal
14	VSS1	System GND (+0V)
15	L/R	H=L channel is output from the DO pin L=R channel is output from the DO pin
16	DEF	H= Emphasis is given to the input data L= Emphasis is not given to the input data
17	DO	16 bit data output
18	WC	Indicates that data is output from the DO pin
19	DIGR	R channel de-glitch signal
20	DIGL	L channel de-glitch signal
21	ERR	H= Parity error or crystal functioning L= No error
22	SEL	Mode select
23	S1	Mode select
24	S2	Mode select
25	SCK	Subcode output clock
26	SSYNC	Subcode signal
27	SDO	Subcode data output pin
28	DIN	Data input pin

YM3414 (Eight times over sampling digital filter)

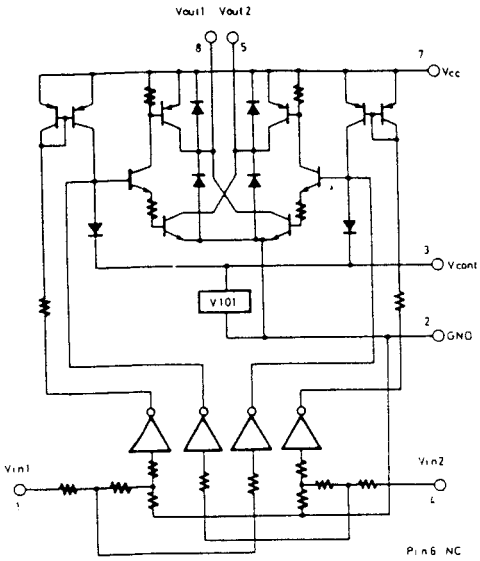


PIN NO.	TERMINAL	I/O	DESCRIPTION
1	SHL	O	When one DAC(TD=L):Deglitching signal of left channel (when four times) When two DAC(TD=H):Deglitching signal of left and right channels(when eight times)
2 3	XO XI	O I	Connect the x'tal oscillator between XI and XO. The clock frequency is 384×Fs.
4	VDD2		+5V:Power supply terminal for x'tal oscillator and deglitching signal.
5 6 7	BCI SDSY SDI	I I I	Bit clock input terminal. Clock shown L/Rch division of input data and input timing. 16 bits serial data input terminal.
8	VDDI		+5V:Power supply terminal for digital signal.
9	DLO	O	When one DAC(TD=L):Output terminal for L/R channel data (When four times) When two DAC(TD=H):Output terminal for L channel data (when eight times)
10 11 12	DRO WCO BCO	O O O	R channel data output terminal. Word clock of output data DLO/DRO. Bit clock of output data.
13	VSS		Ground terminal
14	TD	I	1DAC/2DAC selector terminal: 1DAC at low. 2DAC at high.
15	SYNCS	I	Asynchronous input jitter absorption synchronous signal. Synchronous input at high level. SDSY inhibiting at low level.
16	SHR	O	R channel deglitching signal when one DAC.

NJM2902N (OP Amp)

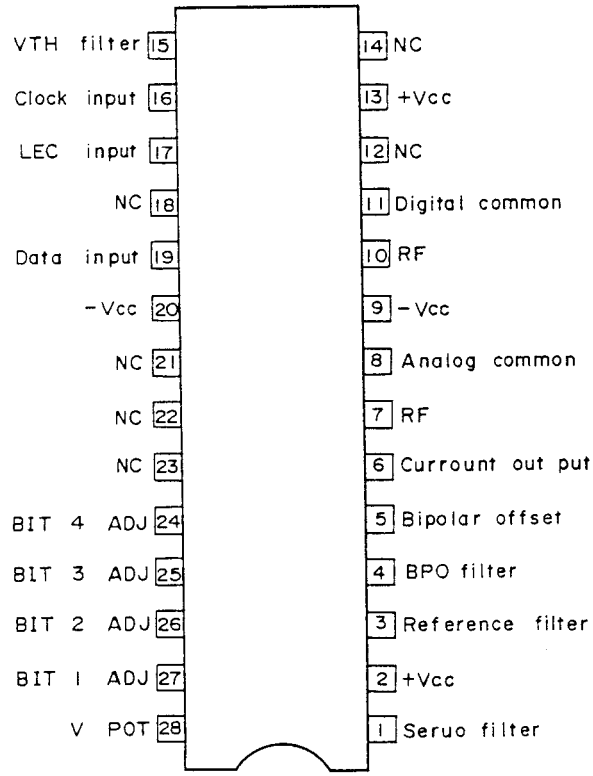


LB1630 (Motor drive)

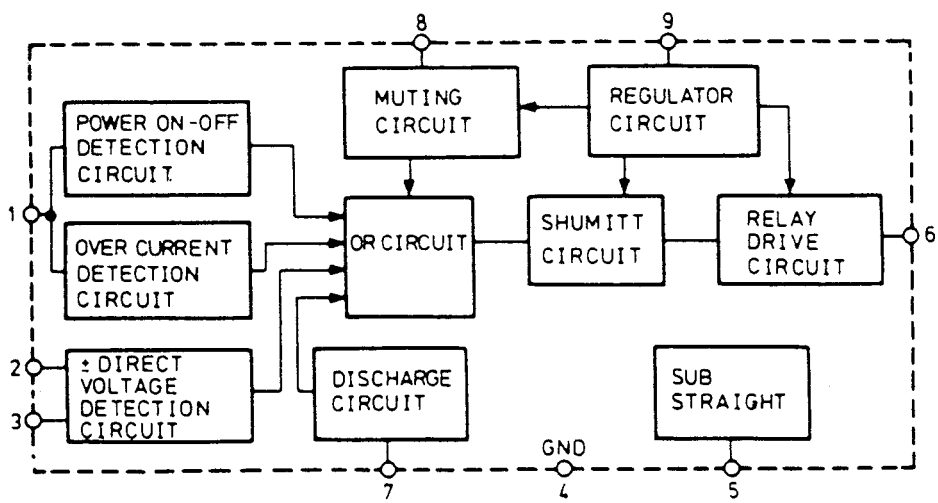


IN1	IN2	OUT1	OUT2	Normal
H	L	H	L	Motor
L	H	L	H	Reverse
H	H	OFF	OFF	Wait
L	L	OFF	OFF	Wait

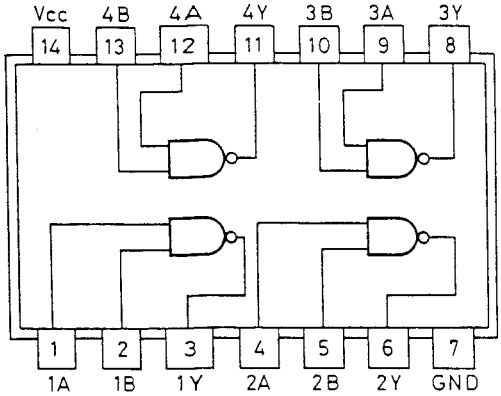
PCM58P (D/A converter)



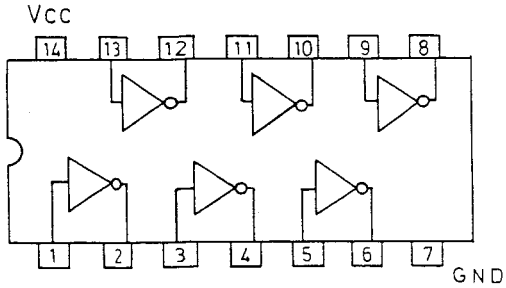
TA7317P (Protective circuit)



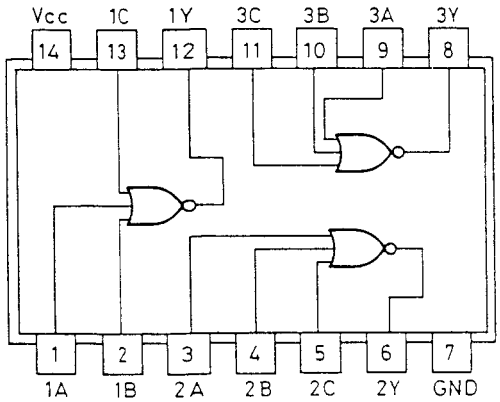
74HC00P (NAND gate)



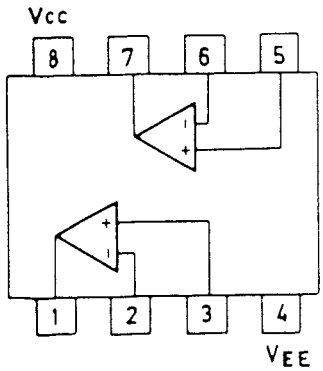
74HCU04P (Hex inverter)



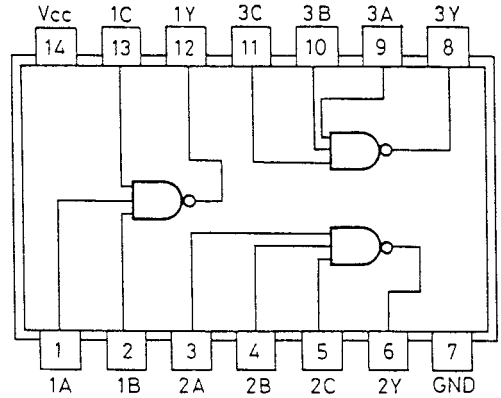
74HC27P (NOR gate)



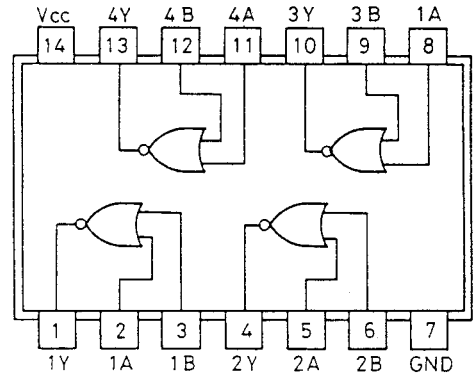
NJM4560D (OP Amp.)
NJM4565D
NJM2904D
NJM5532D, MPC4570



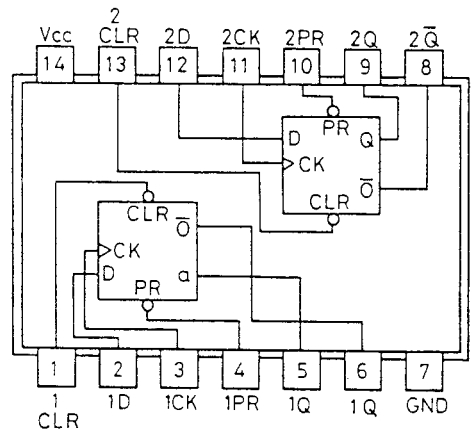
74HC10P (NAND gate)



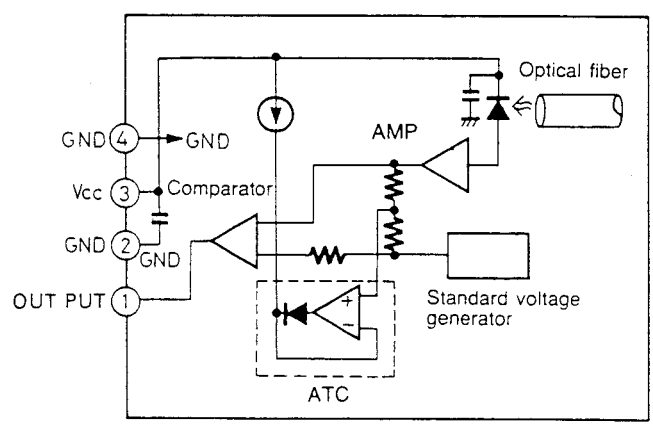
74HC02P (NOR gate)



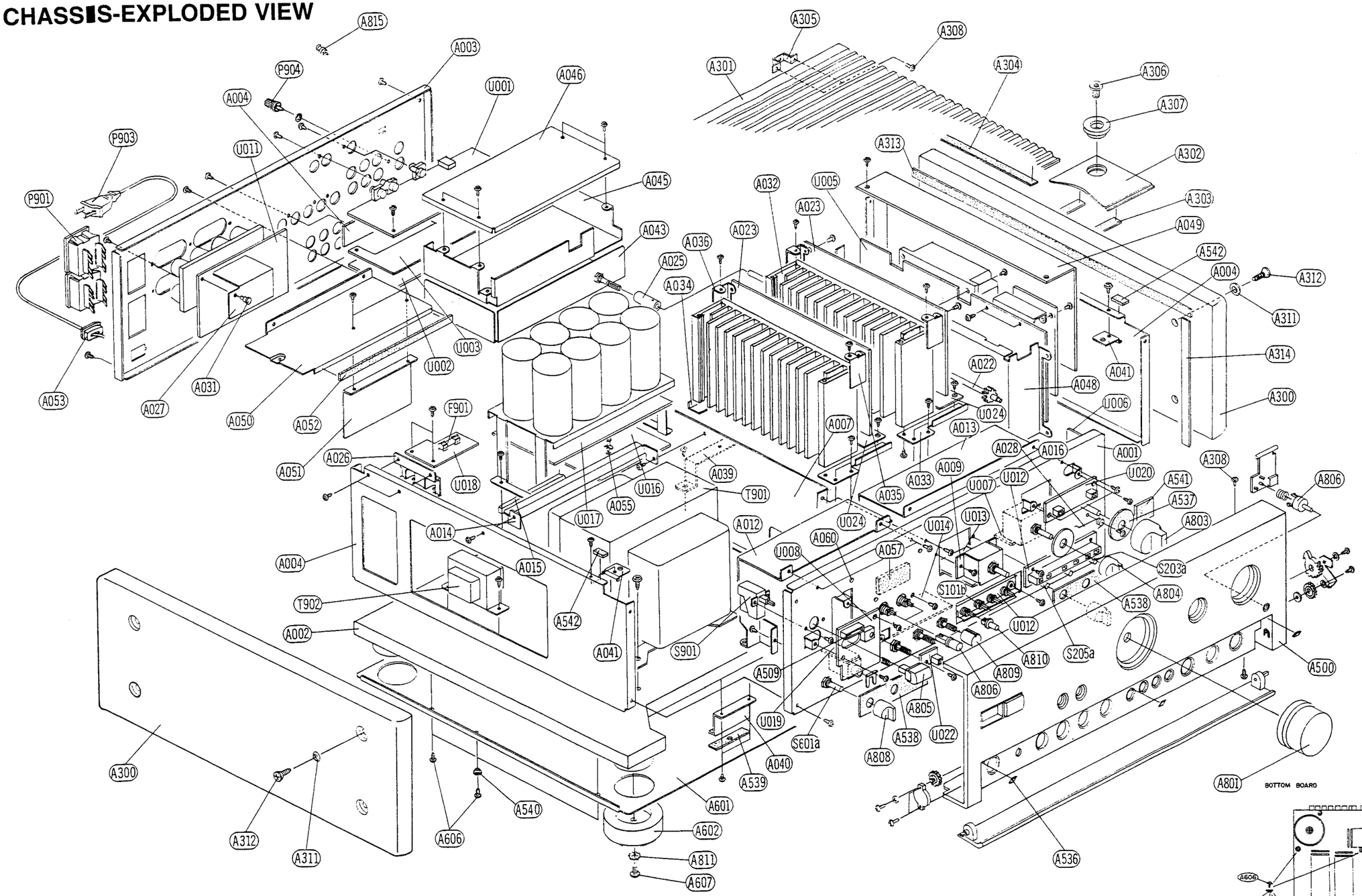
74HC74P (D-FF)

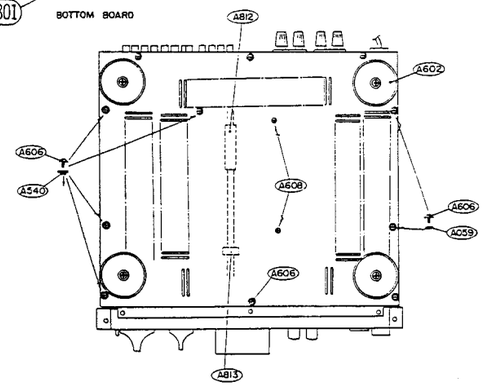


TORX175 (Optical receiver)



CHASSIS-EXPLODED VIEW



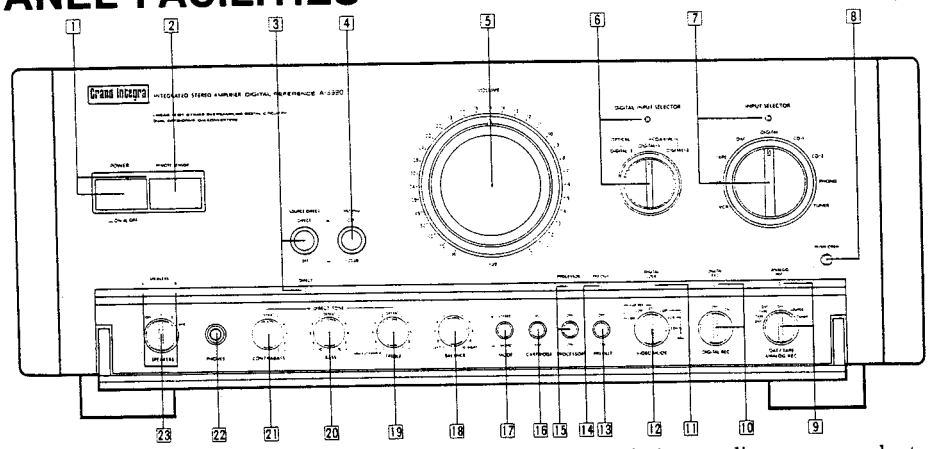


CHASSIS-EXPLODED VIEW-PARTS LIST

REF NO.	PART NO.	DESCRIPTION
A001	271 10386A	FRONT BRACKET
A002	271●00152A	CHASSIS
A003	271221214	BACK PANEL
A004	271 15234B	SIDE BRACKET
A007	271330515B	BRACKET (CT)
A009	27141201	BRACKET (VOL)
A010	271 50244	SHIELD PLATE
A012	271330516-1	BRACKET (L)
A013	271330520-1	BRACKET (R)
A014	271 41260	BRACKET (T)
A015	281 40844	CUSHION
A016	272●5034-1	DRIVE SHAFT ASS'Y
A022	272●5035	SHAFT ASS'Y, LEFT
A025	272 73092A	JOINT
A026	271 41202B	BRACKET (FU)
A027	281 75159-1	INSULATING PLATE
A028	271 80394A	SPRING (LOCK)
A031	880●09	RIVET
A032	271●0237	HEATSINK
A033	271 41204B	BRACKET (HF)
A034	271 41205B	BRACKET (HB)
A035	271 41206	BRACKET (PCF)
A036	271 41207	BRACKET (PCB)
A039	271 41208C	BRACKET (HT)
A040	271 41251B	BRACKET (B)
A041	271 41210A	BRACKET (U)
A043	271 30518C	BRACKET (B)
A045	271 30519B	BRACKET (DB)
A046	272 25090-1	SHIELD CASE (B)
A048	271 30521	BRACKET (DF)
A049	272 25091	SHIELD CASE (D)
A050	272 25093-1	SHIELD CASE (L)
A051	271 50250A	SHIELD PLATE (H)
A052	281 40843	CUSHION
A053	273●0750	BUSHING (CORD)
A055	271 90062	LCBS-12NS, HOLDER
A057	281 40814	CUSHION
A059	873 13006	M-3B, TOOTHED WASHER
A060	271 90428A	KGLS-10RT, HOLDER
A301	281 45134	TOP COVER
A302	281 45127A	TOP PLATE (F)
A303	281 40836	0.5t×350×10, CUSHION
A304	281 40837	0.96t×250×10, CUSHION
A305	271 41153A	BRACKET (T)
A306	801403	5 × 12BC, SPECIAL SCREW
A307	272 65159	COSMETIC RING (F)
A308	801230	3TTS+8BQBC, TAPPING SCREW
A309	1A074609	SIDE BOARD ASS'Y, LEFT
A310	1A074610	SIDE BOARD ASS'Y, RIGHT
(A312)	281 85352	SIDE BOARD
(A078)	281 40854	CUSHION
(A313)	281 40546	0.5t×390×10, CUSHION
(A314)	281 40835	0.5t×135×10, CUSHION
(A315)	281 40855	CUSHION (ONLY RIGHT CHANNEL)
(A511)	271 41269	BRACKET (SIDE)
(A512)	851 43113	M3.1×13FBC, WOOD SCREW
A311	870086	4×12BC, SPECIAL WASHER
A312	836440303	4STV+30CQBC, TAPPING SCREW
A500	1A127121	FRONT PANEL ASS'Y
(A501)	272 11049	FRONT PANEL
(A502)	272 67527	GUIDE (POW)
(A503)	281 98695	FACET (POW)
(A504)	281 91444A	CLEAR PLATE (R)
(A505)	281 35125A	NAME PLATE
(A506)	272 65160	COSMETIC RING (VOL)
(A507)	272 65161	COSMETIC RING (IN)
(A508)	281 98697	FACET (IN)
(A510)	272 67528	GUIDE (MUT)
(A513)	272 62498	PLATE
(A514)	272 67529	GUIDE (BAL)
(A515)	272 67530	GUIDE (SEL)
(A516)	272 67531	GUIDE (PUSH)
(A517)	281986960A	FACKET
(A519)	271 90569A	HOLDER (L)
(A520)	271 90597	HOLDER (R)
(A521)	281 40846	CUSHION
(A522)	272 11046	FRONT PANEL (DOOR)
(A523)	271 90598	HOLDER (DOOR)
(A524)	273 01083	GEAR (DOOR)
(A525)	284 00363	DAMPER
(A526)	271 80427	SPRING
(A527)	273 01086	GEAR (LOCK)
(A528)	273 01087	ARM
(A529)	271 80381A	SPRING
(A530)	271 80385	SPRING
(A531)	833420068	2TTP-6BBC, TAPPING SCREW
(A532)	833426060	2.6TTP+6PBC, TAPPING SCREW
(A533)	876 42607	W2.6×7FBC, WASHER
(A534)	833430080	3TTP+8PBC, TAPPING SCREW
(A535)	870071	WW-6, WAVE WASHER
A536	281 40804	0.5t×3×6, CUSHION
A537	281 40848	CUSHION (A)
A538	281 40787	CUSHION (SEL)
A539	281 75151	INSULATING PLATE
A540	272 70257	SPACER (B)
A541	281 40831	6t×20×20, CUSHION
A542	281 40838	4t×27×10, CUSHION
A601	271 70247-2	BOTTOM BOARD
A602	271 75171A	BOTTOM REG ASS'Y
A606	831430088	3TTW+8BBC, TAPPING SCREW
A607	834440128	4TTS+12BBC, TAPPING SCREW
A608	838440089	4TTB-8CBC, TAPPING SCREW
A801	283 23201	KNOB ASS'Y (VOL)
A803	283 23202B	KNOB (A-SEL)
A804	283 23203A	KNOB (D-SEL)
A805	283 23204	KNOB (POW)
A806	283 23205	KNOB (MUT)
A807	283 23206	KNOB (EJECT)
A808	283 23207A	KNOB (SEL)
A809	283 23208	KNOB (BAL)
A810	283 23209	KNOB (PUSH)
A811	873 14006	M-4B, TOOTHED WASHER
A812	281 40881	CUSHION
A813	281 40373	CUSHION
A815	250153	P0107, (SHORTED PLUG)
Q515, Q516	2212864 or 2212863	2SC3419-Y or 2SC3419-O, TRANSISTOR
Q537, Q538	2201803 or	2SC3857-O or
Q541, Q542	2201806 or 2201804	2SC3857-P or 2SC3857-Y, TRANSISTOR
Q539, Q540	2201793 or	2SA1493-O or
Q543, Q544	2201796 or 2201794	2SA1493-P or 2SA1493-Y, TRANSISTOR
⚠ T901	2300394A	NPT-983G, TRANSFORMER
⚠ T902	2300398A	NPT-984G, TRANSFORMER
⚠ C925	3500065A	0.01μF, AC400V/125V, CAPACITOR
S101b	250651 58	REMOTE SWITCH, WIRE SECTION
S203a	25030298A	NRSM-105-15BU, REMOTE SWITCH, OPERATION SECTION
S205a	25030300A	NRSM-106-15BU, REMOTE SWITCH, OPERATION SECTION
S601a	25030301B	NRSM-104-15BU, REMOTE SWITCH, OPERATION SECTION
⚠ S901	25035345A	NPS-111-L308P, POWER SWITCH
⚠ P903	253148 or 253150	AS-CEE or AS-CEE, POWER SUPPLY CABLE
P904	250600 41	GROUND TERMINAL
⚠ P907	273006 01	SB-1925, COVER (CAPACITOR)
⚠ F902	252078 or 252078CC	5A-SE-EAK or 5A-SE-EAK, PRIMARY FUSE
U001	1A127590-1A	NADG-3490-1A, DIGITAL INPUT TERMINAL PC BOARD ASS'Y
U002	1A127591-1B	NAAF-3491-1B, TAPE INPUT TERMINAL PC BOARD ASS'Y
U003	1A127592-1A	NASW-3492-1A, CD INPUT TERMINAL PC BOARD ASS'Y
U004	1A127593-1	NAETC-3493-1, VIDEO TERMINAL PC BOARD ASS'Y
U005	1A127594-1A	NADG-3494-1A, DIGITAL CIRCUIT PC BOARD ASS'Y
U006	1A127595-1	NAPS-3495-1, DIGITAL POWER SUPPLY PC BOARD ASS'Y
U007	1A127596-1	NASW-3496-1, DIGITAL INPUT SELECTOR SWITCH PC BOARD ASS'Y
U008	1A127597-1A	NAETC-3497-1A, REMOTE CONTROL CIRCUIT PC BOARD ASS'Y
U009	1A127599-1	NASW-3499-1, DIGITAL REC SWITCH PC BOARD ASS'Y
U011	1A127583-2B	NAAR-3183-2B, SPEAKER CIRCUIT PC BOARD ASS'Y
U012	1A127584-2A	NASW-3184-2A, PREOUT SWITCH PC BOARD ASS'Y
U013	1A127586-2	NAAF-3186-2, VOLUME CONTROL PC BOARD ASS'Y
U014	1A127587-2	NAAF-3187-2, TONE CONTROL CIRCUIT PC BOARD ASS'Y
U015	1A127588-2A	NAAF-3188-2A, SOURCE DIRECT SWITCH PC BOARD ASS'Y
U016	1A127590-2	NAPS-3190-2, POWER SUPPLY CIRCUIT PC BOARD ASS'Y
U017	1A127591-2	NAETC-3191-2, CAPACITOR PC BOARD ASS'Y
U018	1A127592-2A	NAETC-3192-2A, FUSE PC BOARD ASS'Y
U019	1A127593-2	NAAF-3193-2, HEAD PHONE TERMINAL PC BOARD ASS'Y
U020	1A127594-2	NADIS-3194-2, DIGITAL/ANALOG DISPLAY PC BOARD ASS'Y
U021	1A127595-2A,	NADIS-3195-2A, LED PC BOARD ASS'Y
U022	1A127596-2	NADIS-3196-2, DIRECT DISPLAY PC BOARD ASS'Y
U023	1A128597-2A	NAAF-3197-2A, MAIN CIRCUIT PC BOARD ASS'Y
U024	1A127599-2	NAAF-3199-2, POWER AMPLIFIER CIRCUIT PC BOARD ASS'Y

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

FRONT PANEL FACILITIES



1. Power switch (POWER)
2. Remote control sensor
3. Source direct switch (SOURCE DIRECT)
   DIRECT, OFF
4. Muting switch (MUTING)
   OFF, ON (−20 dB)
5. Volume control (VOLUME)
6. Digital input selector switch (DIGITAL INPUT SELECTOR)
   COAXIAL → DIGITAL 1, DIGITAL 2
   OPTICAL → DIGITAL 3
7. Input selector switch (INPUT SELECTOR)
   VCR, VDP, TAPE, DAT, DIGITAL, CD-1, CD-2, PHONO, TUNER
8. Open button (PUSH OPEN)
9. Analog recording source selector switch (DAT/TAPE ANALOG REC)
   TAPE►DAT, DAT►TAPE, OFF, SOURCE, TUNER
10. Digital recording source selector switch (DIGITAL REC)
    ON, OFF
11. Digital lock indicator (DIGITAL LOCK)
12. Video mode switch (VIDEO MODE)
    VCR REC → CDV, VDP, OFF
    BGV → VDP, VCR, CDV
13. 14. Pre-out ON/OFF switch (PRE OUT)
15. Processor ON/OFF switch (PROCESSOR)
16. Cartridge selector switch (CARTRIDGE)
    MC, MM
17. Mode selector switch (MODE)
    STEREO, MONO
18. Balance control knob (BALANCE)
19. Treble control knob (TREBLE)
20. Bass control knob (BASS)
21. Contrabass control knob (CONTRABASS)
22. Headphone jack (PHONES)
23. Speaker selector switch (SPEAKERS)
    OFF, A, B, A+B

PRINTED CIRCUIT BOARD – PARTS LIST

DIGITAL INPUT TERMINAL PC BOARD (NADG-3490-1A) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q701	24120017	TORX175
Q702	222755	TC74HCU04P
Q703	222740005	74HC00P
Q704	22240112	TC74HC10P
Q705	222755	TC74HCU04P
Q901	222780052	NEC78M05
	Transistor	
Q181	2201444	2SD1408-Y
Q182	2201434	2SB1017-Y
Q183	2211254 or	2SC1815-Y or
	2211255	2SC1815-GR
Q1842211454 or	2SA1015-Y or	
	2211455	2SA1015-GR
Q185, Q186	2211945	2SK246-GR
Q706, Q707	2211455 or	2SA1015-GR or
	2211456	2SA1015-BL
	Diodes	
D181, D182	224452401 or	MTZ24A or
	224652401	HZ24E-B1
D701, D710, D729	223163	1SS133
D728	224450562 or	MTZ5.6B or
	224650562	HZ5.6E-B2

CIRCUIT NO.	PART NO.	DESCRIPTION
	Coils	
L701, L712	231029	NCH-1068
L702, L711	231054	NCH5095, Filter
L703, L705, L901	231069A	NCH-1119
L704	232143	NSRF-2047, RF coil
	Capacitors	
C181, C182	391252217	220 μF, 25V, Elect. (MUSE)
C183, C184	354764709	47 μF, 35V, Elect.
C185, C186	3504231	3300 μF, 35V, Elect.
C700	379124735	0.47 μF, 50V, Film (DEW)
C702, C709, C711	354741009	10 μF, 16V, Elect.
C713, C715, C931		
C704, C706, C708	354781099	0.1 μF, 50V, Elect.
C932	354724719	470 μF, 6.3V, Elect.
	Resistors	
R739	441722204	22Ω, 2W,Metal oxide film
	Jumper sockets	
JC103, JC208	25050267	NSCT-3P95
	Radiator	
	27160176	RAD-56
	Relay	
RL701	25065362	NRL-1P1A-DC12-053
	Plugs	
P704a	25055132	NPLG-2P116
P707a	25055184	NPLG-3P168

CIRCUIT NO.	PART NO.	DESCRIPTION
	Sockets	
P708	2000947	NSAS-6P899
P709	2000918	NSAS-6P871
P711	2000950	NSAS-6P902
	Terminals	
P701	25045251	NPJ-1PDOR123
P702	25045224	NPJ-2PDOR100

TAPE INPUT TERMINAL PC BOARD (NAAF-3491-1B) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q153, Q154	22240216	NJM4560DH
	Transistors	
Q151, Q152	2211535 or	2SK146-GR or
	2211536	2SK146-BL
	Diodes	
D201, D209	223163	1SS133
	Capacitors	
C155, C156	372121814	180 pF, 50V, Styrene
C159, C160	379122024	2000 pF, 50V, Film (DEW)
C161, C162, C163 C164	379122434	0.024 μF, 50V, Film (DEW)
C165, C166	379124334	0.043 μF, 50V, Film (DEW)
C167~C170	391254707	47 μF, 25V, Elect. (MUSE)
C171, C172	379122024	2000 PF, 50V, Film (DEW)
C173~C176	354754719	470 μF, 25V, Elect.
C217~C222 C225~C228	372121014	100 pF, 50V, Styrene
C157, C158	372126804	68 pF, 50V, Styrene
	Switches	
S101	25065111A	NSS-4257, Slide
S203	25065332	NSS-65129, Slide
S205	25065079	NSS-4643, Slide
	Relaies	
RL201	25065335	NRL-2P1.25A-DC5-045
RL209	25065282	NRL-2P1.25A-DC12-39
	Terminals	
P203	25045201	NPJ-4PDBL82
P204~P205	25045199	NPJ-6PDBL80
P206	25045202	NPJ-4PDBL83
	Jumper sockets	
JC210, JC454 JC656	25050267	NSCT-3P95
	Plug	
P104a	25055133	NPLG-3P117
	Sockets ass'y	
P217	2000870	NSAS-6P826
P218	2000871	NSAS-6P827
P219	2000804	NSAS-6P760

CD INPUT TERMINAL PC BOARD (NASW-3492-1A) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q121	222780055MIT	M5F78M05L
Q123	222790055MIT	79M05L

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q101~Q104	2213536 or	2SB737-E or
	2213535	2SB737-S
Q105~Q108	2213546 or	2SD786-E or
	2213545	2SD786-S
Q109, Q110, Q113	2213534 or	2SB737-R or
Q114	2213535	2SB737-S
Q111, Q112, Q115	2213544 or	2SD786-R or
Q116	2213545	2SD786-S
Q117, Q118	2211164 or	2SC2120-Y or
	2213544 or	2SD786-R or
	2213545	2SD786-S
Q119, Q120	2211504 or	2SA950-Y or
	2213534 or	2SB737-R or
	2213535	2SB737-S
	Diodes	
D101~D106	225251	TLR112, LED
D206, D208	223163	1SS133
	Capacitors	
C101, C102	379121524	1500 pF, 50V, Film (DEW)
C125, C126	379121024	1000 pF, 50V, Film (DEW)
C103, C104	379121034	0.01 μF, 50V, Film (DEW)
C107~C110	354721019	100 μF, 6.3V, Elect.
C111~C114	372124704	47 pF, 50V, Styrene
C115~C118	354743319	330 μF, 16V, Elect.
C119, C120	354721019	100 μF, 6.3V, Elect.
C121~C124	391221027	1000 μF, 6.3V, Elect. (MUSE)
C127~C130	391280477	4.7 μF, 50V, Elect. (MUSE)
C131, C132	379126824	6800 pF, 50V, Film (DEW)
C135~C140	354744719	470 μF, 16V, Elect.
C211~C216	372121014	100 pF, 50V, Styrene
	Resistors	
R135, R137	441721214	120Ω, 2W, Metal oxide film
	Coils	
L101, L102	230905	BL02RN1-R62, Core
L151, L152	231030	NCH-1070
	Switch	
S201	25030296C	NRS-689-20J
	Terminals	
P101, P102, P201	25045233	NPJ-2PDBL107
P202	25045201	NPJ-4PDBL82
	Sockets	
P103	2000949	NSAS-6P901
P104	2000948	NSAS-6P900
P211	2000800	NSAS-6P756
P212	2000673	NSAS-6P629
P213	2000557	NSAS-6P557
P214	2000764	NSAS-6P720
P215	2000803	NSAS-6P759
P216	2000804	NSAS-6P760

VIDEO TERMINAL PC BOARD (NAETC-3493-1) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D203, D205, D207	223163	1SS133
	Terminals	
P207	25045197	NPJ-2PDBL78
P208	25045231	NPJ-3PDBL106
	Relaies	
RL203, RL205 RL207	25065298	NRL-1P1A-DC12-40

DIGITAL CIRCUIT PC BOARD (NADG-3494-1A) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q708	22240113	YM3623B
Q709	22240176	YM3414
Q710	22240112	TC74HC10P
Q711	222740025	74HC02P
Q712	222740275	74HC27P
Q713	222740005	74HC00P
Q714	222740745	74HC74P
Q803, Q804	22240184	PCM58P
Q805~Q808	222902	NJM5532D-D
Q809, Q810	22240201	NJM4565D-B
Q812, Q814	2252173	TLP532
Q904	222570	NJM4560D-X
Q906	22240134	NJM2904D
Q907	226007	TLP-531, PHOTO COUPLER
	Transistors	
Q715, Q813, Q815	2213300	DTA124XS
Q716, Q811	2213290	DTC114ES
Q902	2211164 or	2SC2120-Y or
	2211163	2SC2120-O
Q903	2211504 or	2SA950-Y or
	2211503	2SA950-O
Q905	2211256	2SC1815-BL
	Diodes	
D711~D717	223163	1SS133
D723~D727		
D730		
D811~D813	224651203 or	HZ12E-B3 or
	224451203	MTZ12C, Zener
D931	224650502 or	HZ5.1E-B2 or
	224450512	MTZ5.1B
	Osc. element	
X701	3010134	KD0602FUA
	Capacitors	
C719, C725	354780109	1 μF, 50V, Elect.
C720, C723, C727	354741009	10 μF, 16V, Elect.
C728, C730, C732		
C734, C736		
C821~C824		
C833, C834, C837		
C838		
C722	372124724	4700 pF, 50V, Styrene
C726, C835, C836	354780229	2.2 μF, 50V, Elect.
C839, C840	379121034	0.01 μF, 50V, Film (DEW)
C841, C842	372126214	620 pF, 50V, Styrene
C843~C846	354744709	47 μF, 16V, Elect.
C851~C854		
C847~C850	379122224	2200 pF, 50V, Film (DEW)
C855, C856		
C857~C860	391244707	47 μF, 16V, Elect. (MUSE)
C861~C864	354742219	220 μF, 16V, Elect.
C865, C866	391242207	22 μF, 16V, Elect. (MUSE)
C867, C868	372124724	4700 pF, 50V, Styrene
C933, C934	3504231	3300 μF, 35V, Elect.
C935	354722229	2200 μF, 6.3V, Elect.
C936	354780229	2.2 μF, 50V, Elect.
C937	354762209	22 μF, 35V, Elect.
C938	354721019	100 μF, 6.3V, Elect.
C939, C940, C943	354744709	47 μF, 16V, Elect.
C944		
C941, C942	379121034	0.01 μF, 50V, Film (DEW)
C945, C946	354742219	220 μF, 16V, Elect.
C869, C870	372121014	100 pF, 50V, Styrene
C871, C872	391251017	100 μF, 25V, Elect. (MUSE)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Resistors	
R821~R828	5210019	N06HR100KBDM, Semi-fixed
R858	442525114	510Ω, 1/2W, Metal oxide film
R878	442521524	1.5kΩ, 1/2W, Metal oxide film
R931	442521324	1.3kΩ, 1/2W, Metal oxide film
R932	442521114	110Ω, 1/2W, Metal oxide film
	Coils	
L713	233360	NCH-2164
L714	231030	NCH-1070
	Relaies	
RL803, RL804	25065362	NRL-1P1A-DC12-053
RL805	25065282	NRL-2P1.25A-DC12-39
	Jumper sockets	
JC707a, JC708a	25050267	NSCT-3P95
	Plugs	
P216a, P711a	25055133	NPLG-3P117
P710a	25055185	NPLG-4P169
	Bracket (Buss)	
	27160215-1	

DIGITAL POWER SUPPLY PC BOARD (NAPS-3495-1) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q908	222780155MIT	M5F78M15L
Q909	222790155MIT	M5F79M15L
	Capacitors	
C947, C948	354744709	47 μF, 16V, Elect.
C949, C950	354764719	470 μF, 35V, Elect.
	Jumper socket	
JC305	25050280	NSCT-3P108
	Radiator	
	27160176	RAD-56

DIGITAL INPUT SELECTOR SWITCH PC BOARD (NASW-3496-1) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Switch	
S701	25030308	NRSM-113-35J
	Jumper socket	
JC706	25050268	NSCT-4P96

REMOTE CONTROL CIRCUIT PC BOARD (NAETC-3497-1A) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Photo receiving unit	
U781	24130001	GP1U501S
	ICs	
Q781	222755	TC74HCU04P
Q782	22240173	LC6527H-3722
Q783	222963	LB1630
Q784	222780052	78M05
Q786	22240018	M51943ASL
	Diodes	
D531, D532	225137DG or	SEL2413E-DG or
	225137DY or	SEL2413E-DY or
	225137CG or	SEL2413E-CG or
	225137CY	SEL2413E-CY, LED
D781, D782	223163	1SS133
D921, D922	225142DX1 or	SEL2913K-DX1 or
	225142DX2 or	SEL2913K-DX2 or
	225142CX1 or	SEL2913K-CX1 or
	225142CX2	SEL2913K-CX2, LED
	Coils	
L781~L784	231054	NCH5095, Filter
L785	230905	BL02RN1-R62, FR Core
	Osc. element	
X781	3010099	CSA4.00MG
	Capacitors	
C784	353784799	0.47 μF, 50V, Elect.
C786	353734709	47 μF, 10V, Elect.
C787	354744709	47 μF, 16V, Elect.
C788	354741009	10 μF, 16V, Elect.
C791, C792, C794	379121035	0.01 μF, 50V, Film (DEW)
C795		
	Switch	
S702	25030309	NRSM-122-15U
	Plug	
P709a	25055184	NPLG-3P168
P781a	25055132	NPLG-3P116
	Socket	
P782	2000589A	NSAS-6P545
	Jumper socket	
JC655	25050280	NSCT-3P-108
	Rivet	
	880011	NRP-355
	Holders	
	27190454A	(PLED)
	27190599	(LED)

DIGITAL REC SWITCH PC BOARD (NASW-3499-1) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Switch	
S702	25030309	NRSM-122-15U
	Plug	
P709a	25055184	NPLG-3P168

ABSOLUTE PHASE CIRCUIT PC BOARD (NAAF-3500-1) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q451, Q452	22240050	MPC4570C
	Diodes	
D451, D453	223163	1SS133
D455, D456	224651203 or	HZ12E-B3 or
	224451203	MTZ12C, Zener
	Capacitors	
C451, C452	391280227	2.2 μF, 50V, Elect.
C453, C454	372126804	68 pF, 50V, Styrene
C455~C458	391244707	47 μF, 16V, Elect. (MUSE)
C459~C462	372121014	100 pF, 50V, Styrene
C465, C466	354744719	470 μF, 16V, Elect.
	Resistors	
R479, R480	442525614	560Ω, 1/2W, Metal oxide film
	Relays	
RL451	25065335	NRL-2P1.25A-DC5-045
RL453	25065282	NRL-2P1.25A-DC12-39
	Plugs	
P210a, P219a	25055133	NPLG-3P117
P406a, P407a		
	Jumper socket	
JC454	25050267	NSCT-3P95

SPEAKER CIRCUIT PC BOARD (NAAR-3183-2B) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q801	222584	TA7317P
	Diodes	
D801, D803	223163	1SS133
D802	224650623 or	HZ6.2E-B3 or
	2243463	MTZ6.2C
D910, D911	223894	1N4002F
	Coils	
L501, L502	231134S	S-0.8E
	Capacitors	
C601~C604	372121024	1000 pF, 50V, Styrene
C801, C802	354722219	220 μF, 6.3V, Elect.
C803, C804, C806	354742209	22 μF, 16V, Elect.
C807	354784799	0.47 μF, 50V, Elect.
C809	354743319	330 μF, 16V, Elect.
C810~C812	379121035	0.01 μF, 50V, Film (DEW)
C919	354741029	1000 μF, 16V, Elect.
C920	354780479	4.7 μF, 50V, Elect.
C921	354744719	470 μF, 16V, Elect.
	Resistors	
R655, R656	441723914	390Ω, 2W, Metal oxide film
R657, R658	442520564	5.6Ω, 1/2W, Metal oxide film
R807, R808	442520334	3.3Ω, 1/2W, Metal oxide film
	Terminal	
P601	25060124	NTM-8PDMN057
	Switches	
S601	25065333A	NSS-64130
	Relay	
RL801	25065316	NRL-2P7A-DC12-43
	Clamp	
	27190540	UAMS-03-0

CIRCUIT NO.	PART NO.	DESCRIPTION
	Plug	
P219a	25055133	NPLG-3P117

PRE/MAIN SWITCH PC BOARD (NASW-3184-2A) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diode	
D441	223163	1SS133
	Switches	
S101a, S403, S405 S703	25035580A	NPS-100-222-162-L542
	Jumper socket	
JC406	25050267	NSCT-3P95
	Plugs	
P217a, P218a	25055133	NPLG-3P117
	Shield	
	2050006	NCS-8P4E17

VOLUME CONTROL PC BOARD (NAAF-3186-2) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D431, D432	223163	1SS133
	Resistor	
R433	5104219	N27DQL100KT30M, Variable
	Jumper socket	
JC405a	25050273	NSCT-9P101
	Plugs	
P401a, P402a P782a	25055133	NPLG-3P117

TONE CONTROL CIRCUIT PC BOARD (NAAF-3187-2) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C401, C402	379125624	5600 pF, 50V, Film (DEW)
C403, C404	379121024	1000 pF, 50V, Film (DEW)
C405, C406	379128224	8200 pF, 50V, Film (DEW)
C407, C408	379123934	0.039 μF, 50V, Film (DEW)
C409, C410	379128234	0.082 μF, 50V, Film (DEW)
	Resistors	
R415	5104220	N27DGLC250KMN20, Variable
R417	5104222	N27DQL11C139K176K20, Variable
R419	5104223	N27DGL6C176K20, Variable
R421	5104221	N27DGL11C219K20, Variable
	Shield plate	
JC402	2050004A	NCS-7P4E15
JC405	2050003A	NCS-9P5E20

MUTING SWITCH CIRCUIT PC BOARD (NAAF-3188-2A) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Switches	
S401, S407	25035579	NPS-122-162-L541
	Plug	
P215a	25055133	NPLG-3P117
	Sockets	
P401	2000624	NSAS-6P580
P402	2000802	NSAS-6P758
P406	2000896	NSAS-6P852
P507	2000788A	NSAS-4P744
P508	2000789	NSAS-4P745
	Jumper sockets	
JC402a	25050271	NSCT-7P99
JC403	25050272	NSCT-8P100

POWER SUPPLY CIRCUIT PC BOARD (NAPS-3190-2) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D901, D902	22380014AF	PB102F
D903, D904	22380003	1N5402F
D907, D908	22380013	RDF02M
D909	223890	W01RL
D912, D913	22380003	1N5402F
D951	223889	RC202
	Capacitors	
C909, C910 C911, C912	375103345	0.33 μF, 125V, Film (ME)
C913, C914	375104745	0.047 μF, 125V, Film (ME)
C915~C918	354762229	2200 μF, 35V, Elect.
C922, C923	379121035	0.01 μF, 50V, Film (DEW)
C924	354744709	47 μF, 16V, Elect.
C951	3504216	10000 μF, 16V, Elect.
C952	379121035	0.01 μF, 50V, Film (DEW)
	Resistors	
R901, R902	442525104	51 Ω, 1/2W, Metal oxide film
R905~R908	442522294	0.22Ω, 1/2W, Metal oxide film
R911~R917	442520104	1Ω, 1/2W, Metal oxide film
	Sockets	
P704, P781	2000789	NSAS-4P745
	Jumper sockets	
JC102, JC310 JC801	25050267	NSCT-3P95

CAPACITOR PC BOARD (NAETC-3191-2) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C901~C908	3504215A	12000 μF, 80V, Elect.
	Bracket	
	27130517A	Bracket (K)
	Plate	
	27301084	BUS (A)
	27301085	BUS (B)
	Ribet	
	880011	NRP-355

FUSE PC BOARD (NAETC-3192-2A) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Fuse holder	
F902a	25050065	YSH-403T
	Terminal	
	25060092	NTM-1S33

HEAD PHONE TERMINAL PC BOARD (NAAF-3193-2) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Terminal	
	25045229	HLJ4317-01-3120
	Jumper socket	
JC654	25050268	NSCT-4P96

DIGITAL/ANALOG DISPLAY PC BOARD (NADIS-3194-2) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q204, Q205	2211255 or 2211254	2SC1815GR or 2SC1815-Y
Q206, Q207	2211455 or 2211454	2SA1015GR or 2SA1015Y
	Diodes	
D213	225137DG or 225137DY or 225137CG or 225137CY	SEL2413E-DG or SEL2413E-DY or SEL2413E-CG or SEL2413E-CY, LED
D214	224650472 or 224450472 or 224650473 or 224450473	HZ4.7E-B2 or MTZ4.7B or HZ4.7E-B3 or MTZ4.7C, Zener
D215	225142DX1 or 225142DX2 or 225142CX1 or 225142CX2	SEL2913K-DX1 or SEL2913K-DX2 or SEL2913K-CX1 or SEL2913K-CX2, LED
	Capacitors	
C202	379121035	0.01 μF, 50V, Film (DEW)
C203	354721019	100 μF, 6.3V, Elect.
	Jumper socket	
JC203	25050268	NSCT-4P96
	Socket	
P707	2000946	NSAS-6P898
	Holder	
	27190599	Holder (LED)

LED PC BOARD (NADIS-3195-2A) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D216, D722	225142DX1 or 225142DX2 or 225142CX1 or 225142CX2	SEL2913K-DX1 or SEL2913K-DX2 or SEL2913K-CX1 or SEL2913K-CX2, LED
D402, D721	225137DG or 225137DY or 225137CG or 225137CY	SEL2413E-DG or SEL2413E-DY or SEL2413E-CG or SEL2413E-CY, LED
D718	225248	GL5ED5, LED
	Jumper sockets	
JC209	25050267	NSCT-3P95
JC451	25050268	NSCT-4P96
	Plug	
P708a	25055184	NPLG-3P168
	Socket	
P710	2000986	NSAS-8P938
	Holder	
	27190600A	Holder (LED6)

DIRECT DISPLAY PC BOARD (NADIS-3196-2) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D401	225137DG or 225137DY or 225137CG or 225137CY	SEL2413E-DG or SEL2413E-DY or SEL2413E-CG or SEL2413E-CY, LED
	Holder	
	7190599	Holder (LED)

MAIN CIRCUIT PC BOARD (NAAF-3197-2A) – PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q549	222652	M5218L
	Transistors	
Q501	2212005 or 2212806	2SK389-GR or 2SK389-BL
Q503, Q505	2211732 or 2211733	2SC1845-F or 2SC1845-E
Q507	2211515 or 2211516	2SA995-F or 2SA996-G
Q509	2211455 or 2211454	2SA1015-GR or 2SA1015-Y
Q511, Q519	2211359 or 2211358	2SA949-Y(ONK) or 2SA949-O(ONK)
Q513	2211255	2SC1815-GR
Q517	2211639 2211638	2SC2229-Y(ONK) or 2SC2229-O(ONK)
Q521	2211639	2SC2229-Y(ONK)
Q523	2211359	2SA949-Y(ONK)
Q525	2211515 or 2211516	2SA995-F or 2SA995-G
Q527	2211445 or 2211446	2SC2291-F or 2SC2291-G
Q529	2211359	2SA949-Y(ONK)
Q531	2211639	2SC2229-Y(ONK)
Q533	2201644 or	2SC3298-Y or

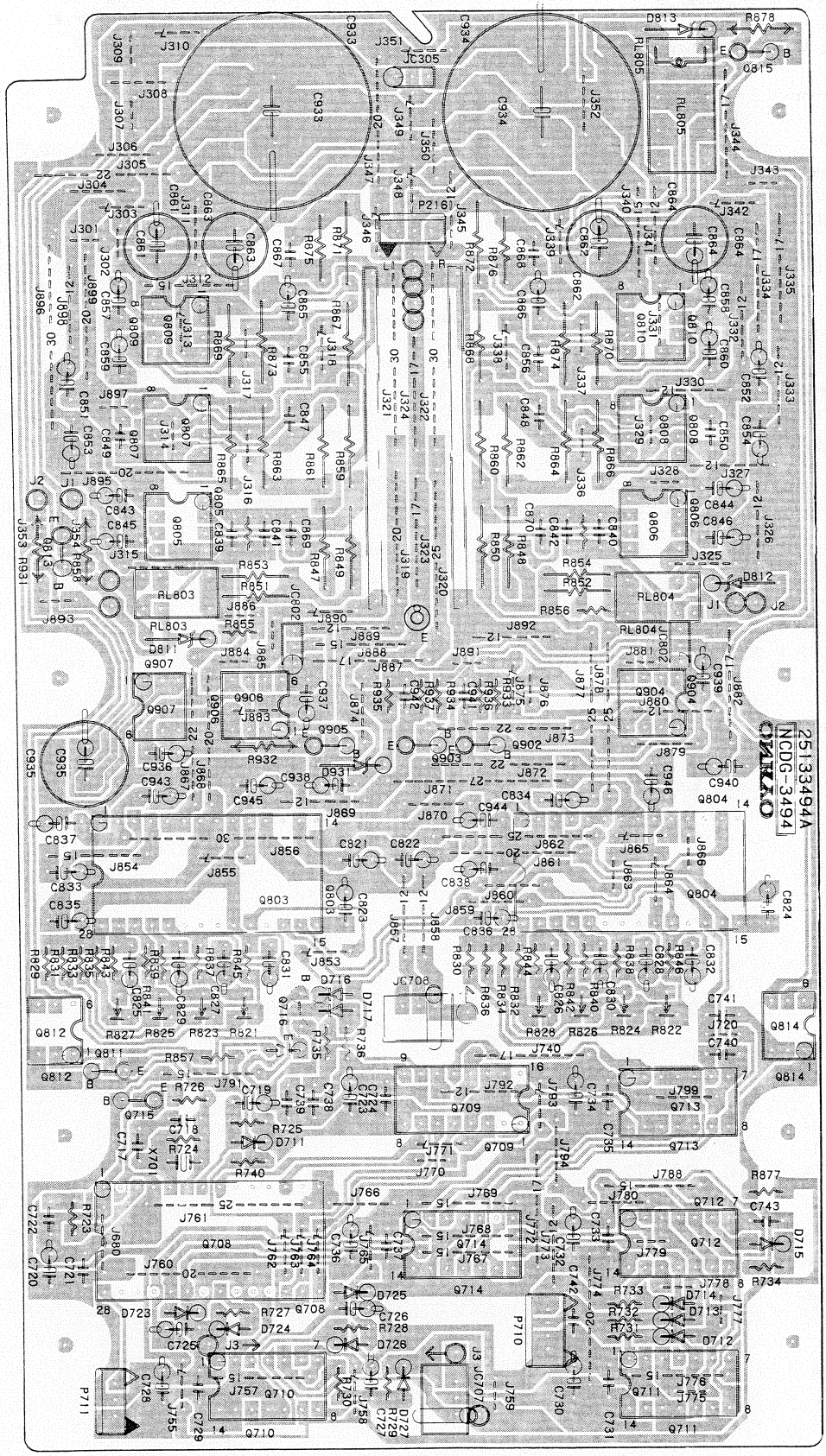
CIRCUIT NO.	PART NO.	DESCRIPTION
	2201643	2SC3298-O
Q535	2201634 or	2SA1306-Y or
	2201633	2SA1306-O
Q551	2211732 or	2SC1845-F or
	2211733	2SC1845-E
Q553	2211792 or	2SA992-F or
	2211793	2SA992-E
Q555	2201444 or	2SD1408-Y or
	2201443	2SD1408-O
Q557	2201434 or	2SB1017-Y or
	2201433	2SB1017-O
Q559~Q565	2213334	2SK373-Y
	Diodes	
D503	224650622 or	HZ6.2E-B2 or
	224450622	MTZ6.2B, Zener
D505, D519, D521	225232	LTZ-R15, Zener
D507	4000120	KB-265, Varistor
D509, D511, D513	223163	1SS133
D515, D517		
D523, D525	224651802 or	HZ18E-B2 or
	224451802	MTZ18B, Zener
	PAC ass'y	
U026	1A127700	
	Capacitors	
C501	372123304	33 pF, 50V, Styrene
C503	354741009	10 μF, 16V, Elect.
C505	372121014	100 pF, 50V, Styrene
C509, C511	3500110	220 μF, 100V, Elect.
C513	3500113	470 μF, 35V, Elect.
C515, C525	354721019	100 μF, 6.3V, Elect.
C517	3500111	2200 μF, 6.3V, Elect.
C527, C529	372121024	1000 pF, 50V, Styrene
C543, C545	391252207	22 μF, 25V, Elect.(MUSE)
C547	372123304	33 pF, 50V, Styrene
C549, C551	3500112	330 μF, 63V, Elect.
C557, C559	354764709	47 μF, 35V, Elect.
C561, C563	3500114	470 μF, 25V, Elect.
C567	391254707	47 μF, 25V, Elect. (MUSE)
C569	372123304	33 pF, 50V, Styrene
C571, C573	373304714	470 pF, 125V, Film (PP)
C575	372126804	68 pF, 50V, Styrene
	Resistors	
R511	441623014	300Ω, 1W, Metal oxide film
R521	442520684	6.8Ω, 1/2W, Metal oxide film
R523	441721334	13 kΩ, 2W, Metal oxide film
R525	442523624	3.6kΩ, 1/2W, Metal oxide film
R527	441625134	51 kΩ, 1W, Metal oxide film
R533	5221025	N10HR2.2KBEM, Semi-fixed
R535, R537	442520564	5.6Ω, 1/2W, Metal oxide film
R539	442521224	1.2kΩ, 1/2W, Metal oxide film
R541, R543, R545	442524714	470Ω, 1/2W, Metal oxide film
R547		
R549	442528214	820Ω, 1/2W, Metal oxide film
R551, R553	442524314	430Ω, 1/2W, Metal oxide film
R555, R557, R559	442522204	22 Ω, 1/2W, Metal oxide film
R561		
R563	442521014	100Ω, 1/2W, Metal oxide film
R633, R635	441628214	820Ω, 1W, Metal oxide film
R669, R671	442524704	47 Ω, 1/2W, Metal oxide film
	Radiator	
	27160223	RAD-75(B)
	Plugs	
P501, P505	25055328	NPLG-3P311
P503	25055335	NPLG-10P318
P507	25055132	NPLG-2P116

POWER AMPLIFIER CIRCUIT PC BOARD (NAAF-3199-2) – PARTS LIST

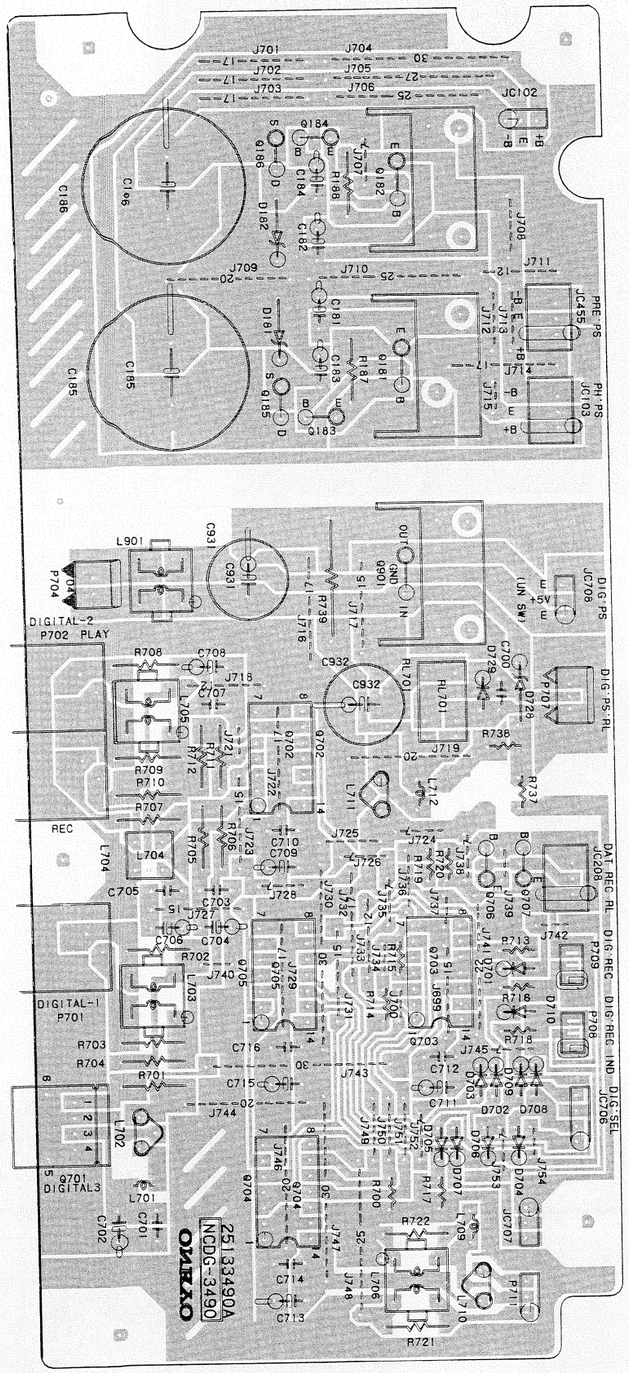
CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q545	2212560	2SC3333
Q547	2211792 or	2SA992-F or
	2211793	2SA992-E
	Diodes	
D527	223153	1SS81
	Capacitors	
C519	379122235	0.022 μF, 50V, Film (DEW)
C531	379121045	0.1 μF, 50V, Film (DEW)
C533	379136835	0.068 μF, 100V, Film (DEW)
C535, C537	379132245	0.22 μF, 100V, Film (DEW)
C539	379124735	0.047 μF, 50V, Film (DEW)
C541	379121035	0.01 μF, 50V, Film (DEW)
	Resistors	
R565, R567, R569	442520224	2.2Ω, 1/2W, Metal oxide film
R571		
R573, R575, R577	4000079	0.39Ω, 5W, Metal plate
R579		
R581, R583	4000067	1Ω, 2W, Metal plate
R585, R587, R589	442521004	10Ω, 1/2W, Metal oxide film
R591		
R593, R595	442523304	33Ω, 1/2W, Metal oxide film
R597, R599, R601	442521014	100Ω, 1/2W, Metal oxide film
R613		
R609, R611	441621204	12Ω, 1W, Metal oxide film

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

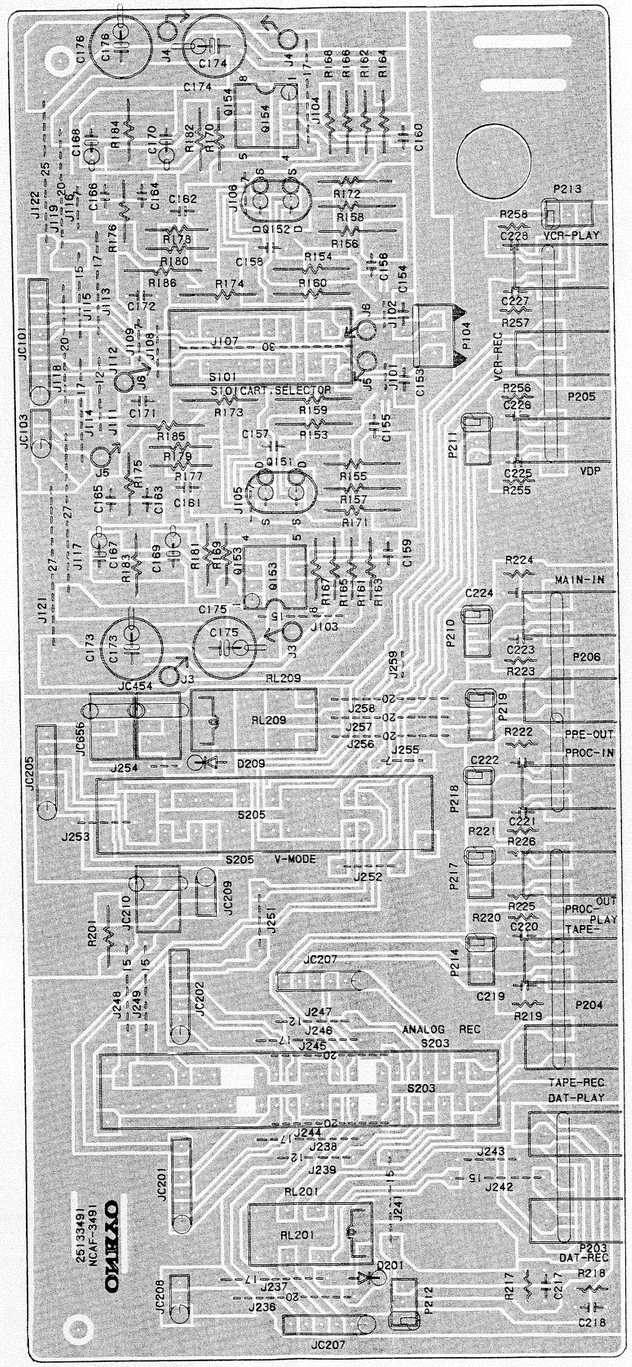
NADG-3494-1A



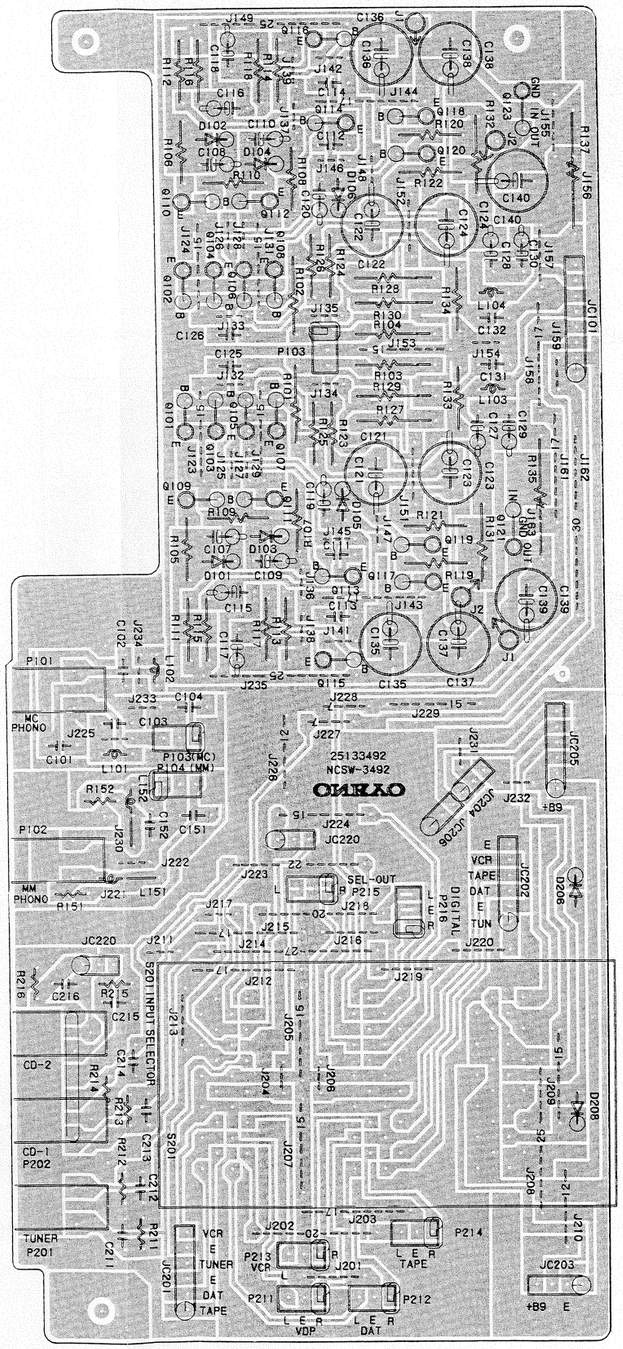
NADG-3490-1A



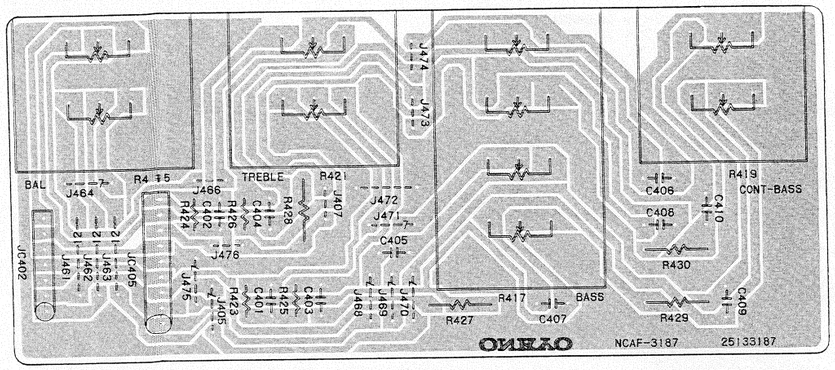
NAAF-3491-1B



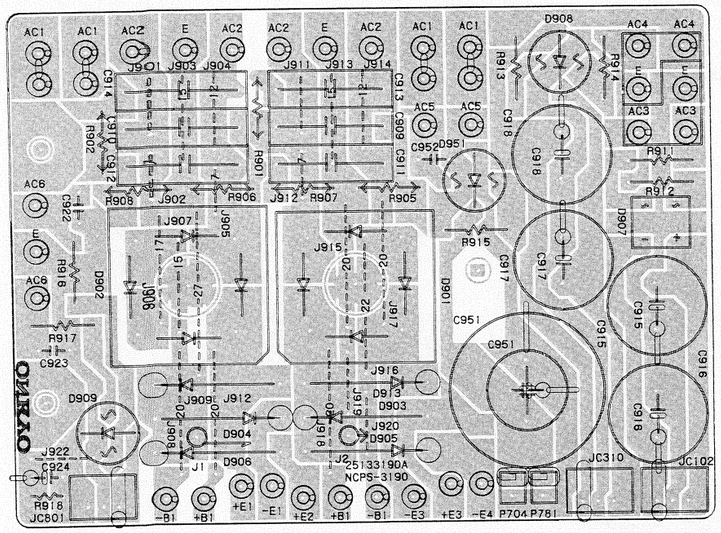
NASW-3492-1A



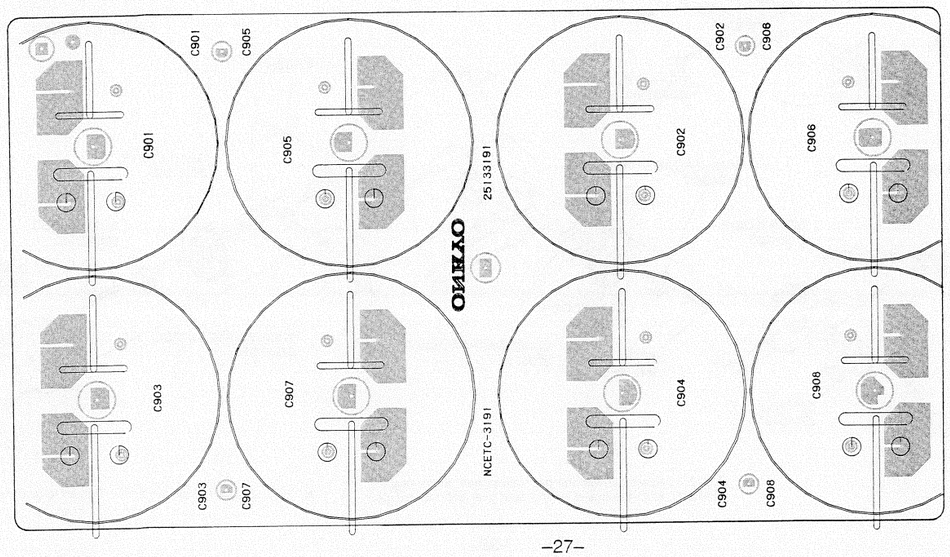
NAAF-3187-2



NAPS-3190-2



NAETC-3191-2



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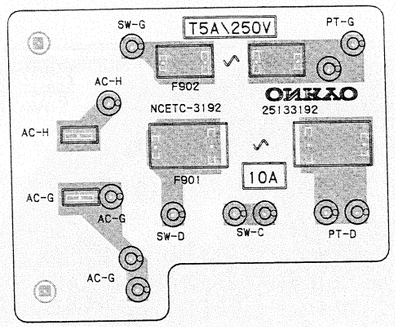

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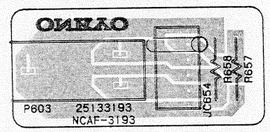
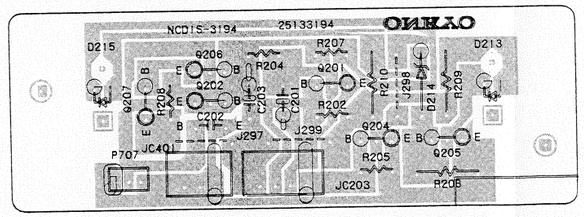
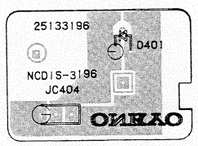


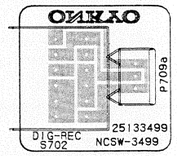
NADIS-3194-2



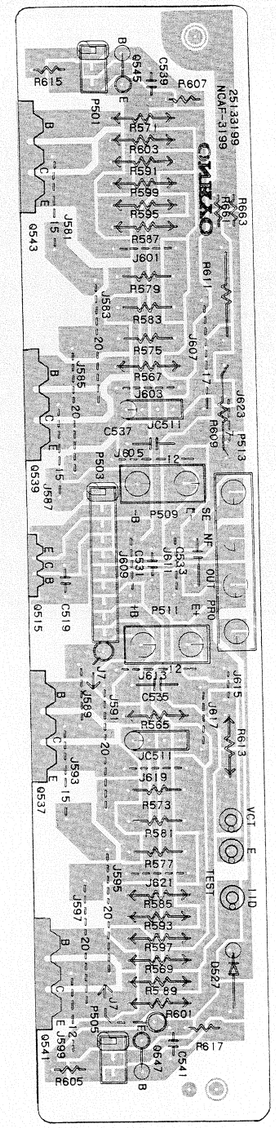
NADIS-3196-2



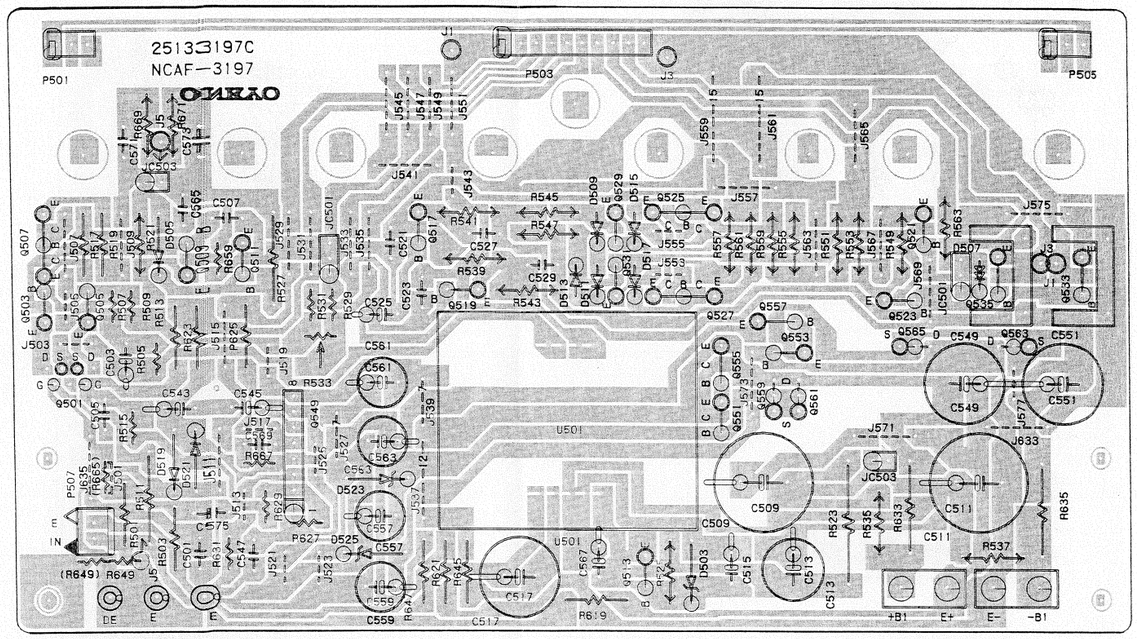
NASW-3499-1



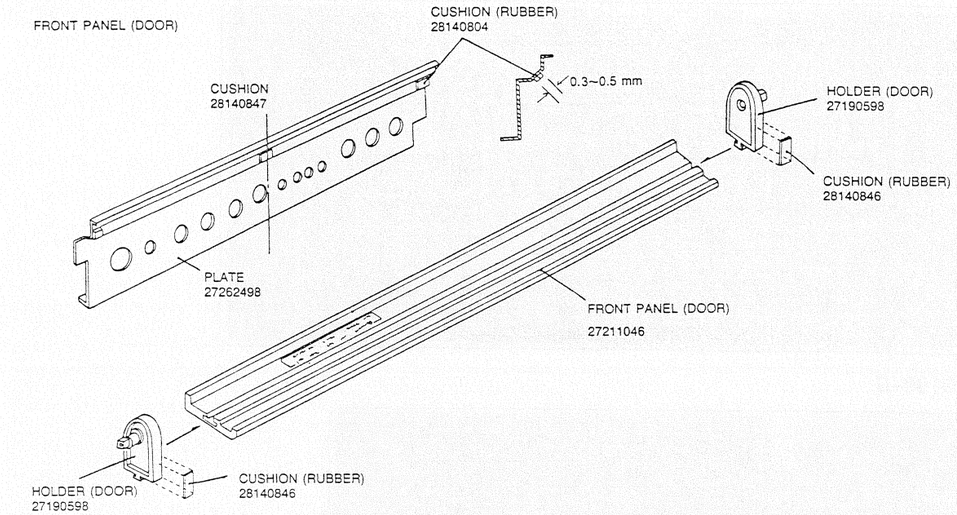
NAAF-3199-2



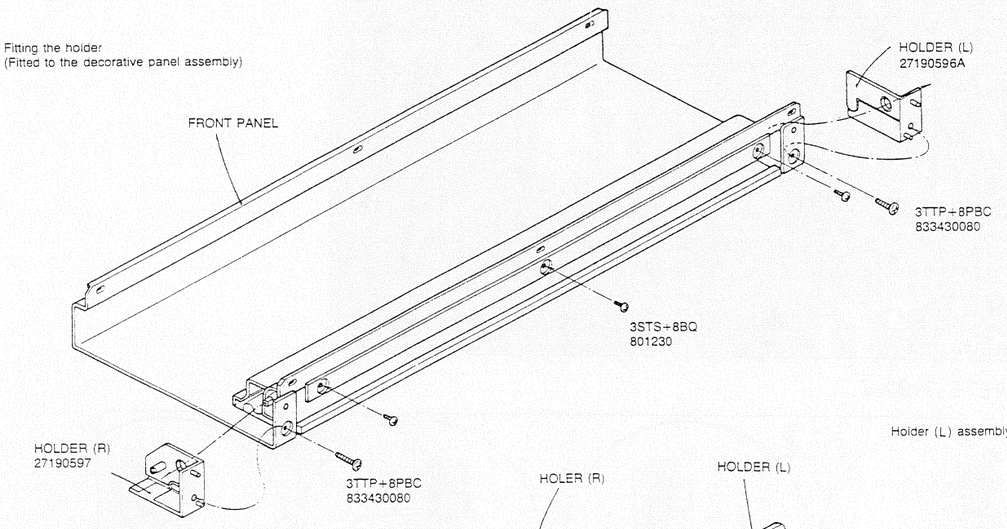
NAAF-3197-2A



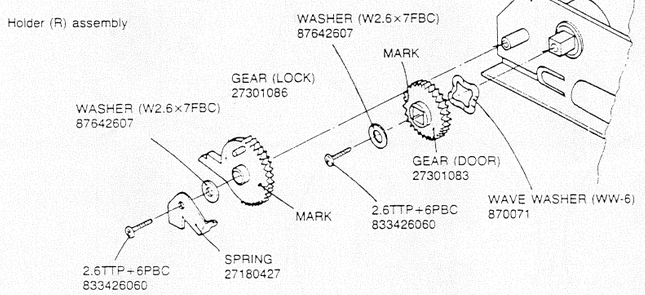
SERVICE PROCEDURES



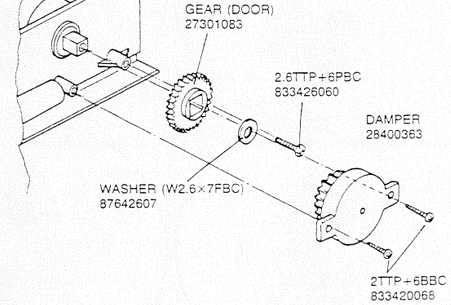
Fitting the holder
(Fitted to the decorative panel assembly)



Holder (R) assembly



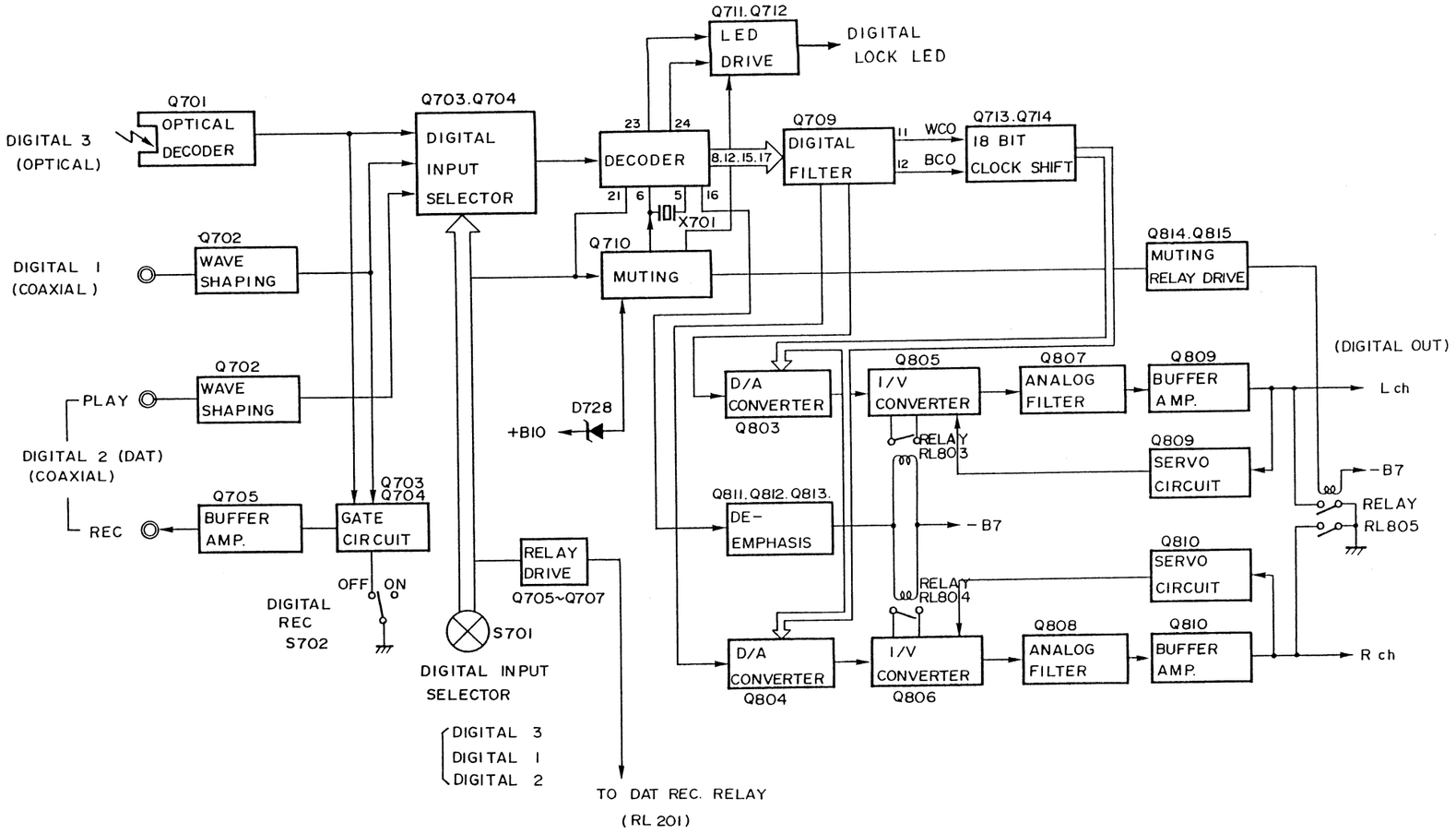
Holder (L) assembly



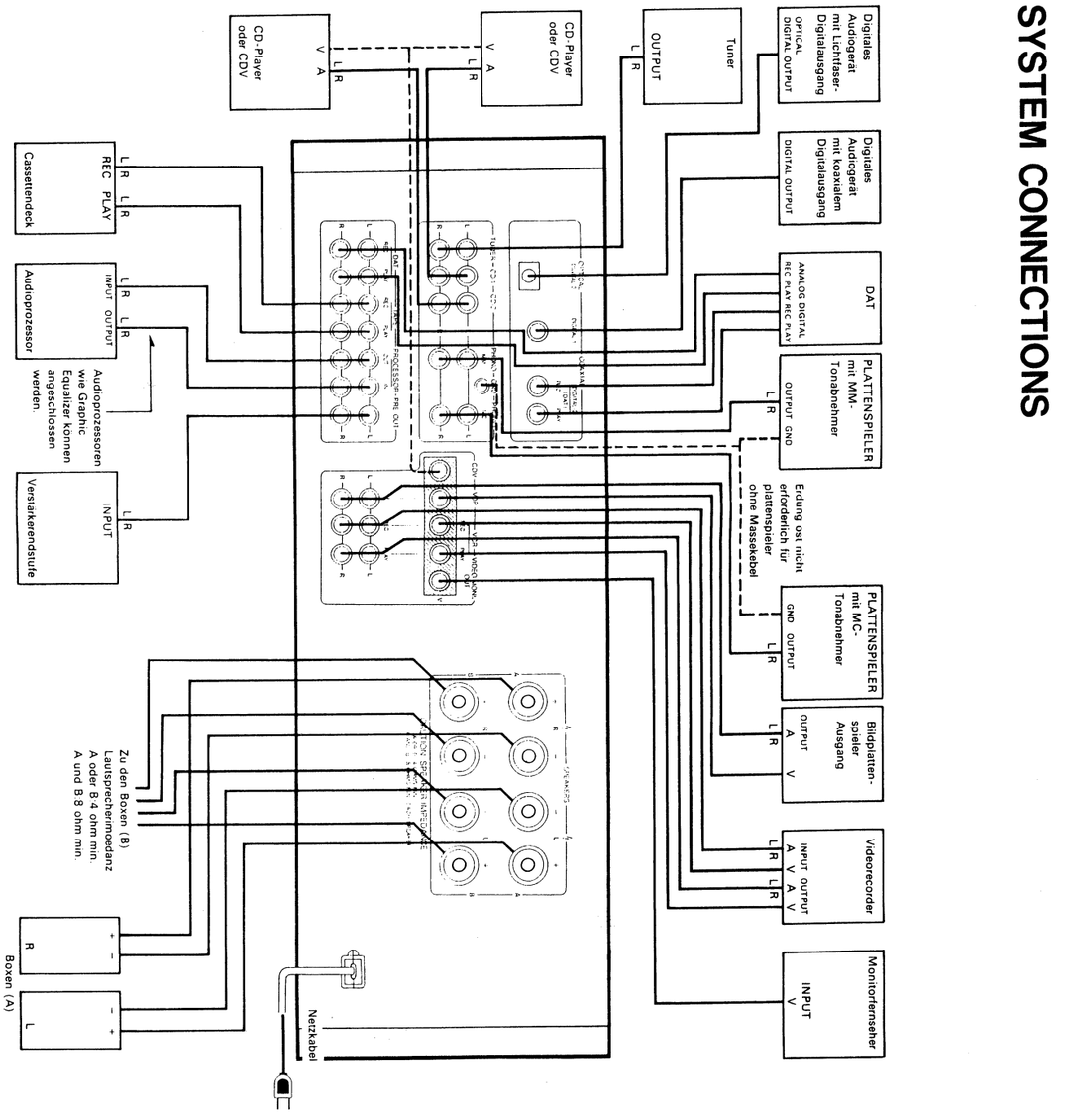
NOTE 1: Assemble with the decorative panel (door) open.
NOTE 2: Align the marks on the door gear and the lock gear.

NOTE 3: Do not tighten too firmly. Tighten to a torque of 1 kg.

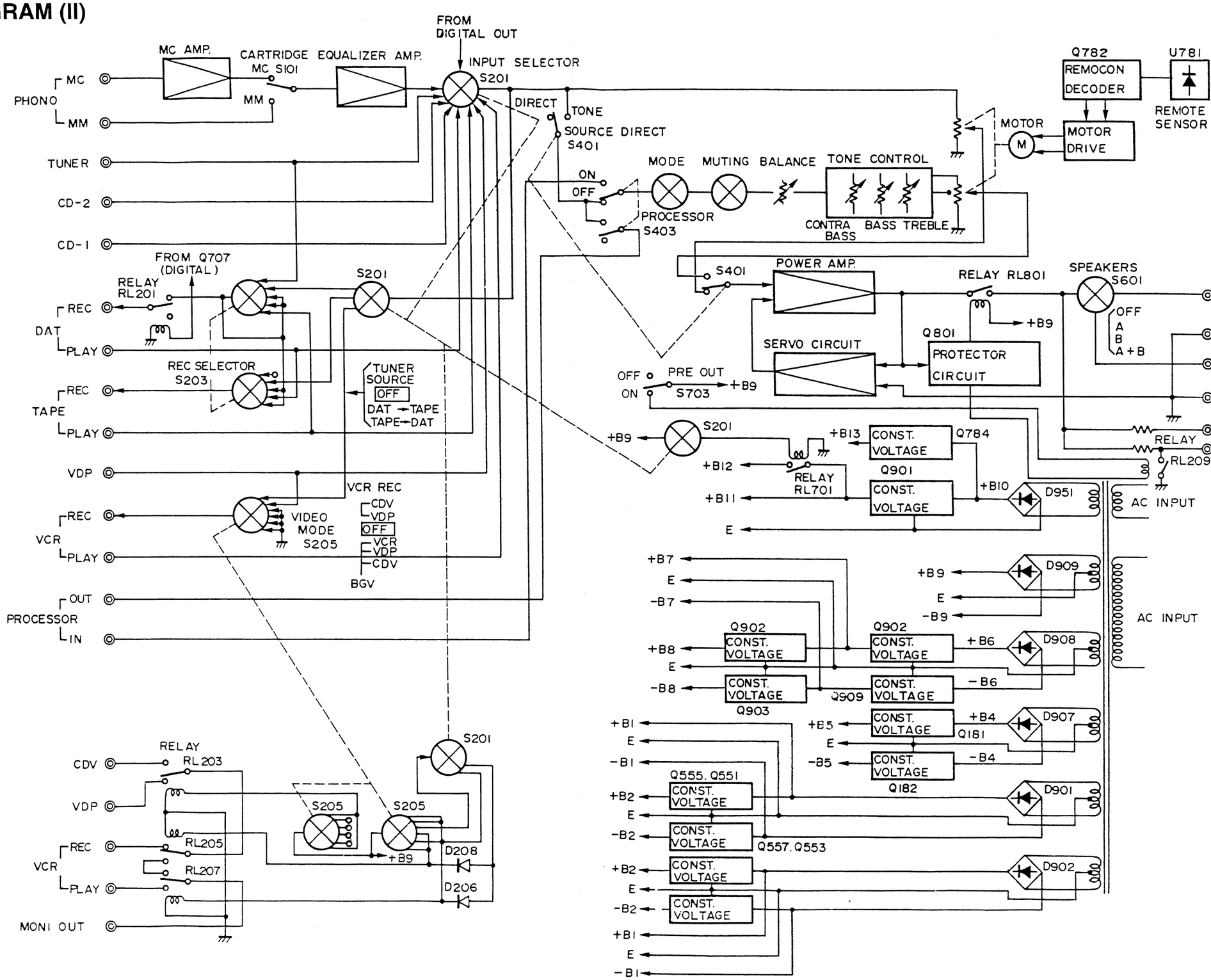
BLOCK DIAGRAM (I)



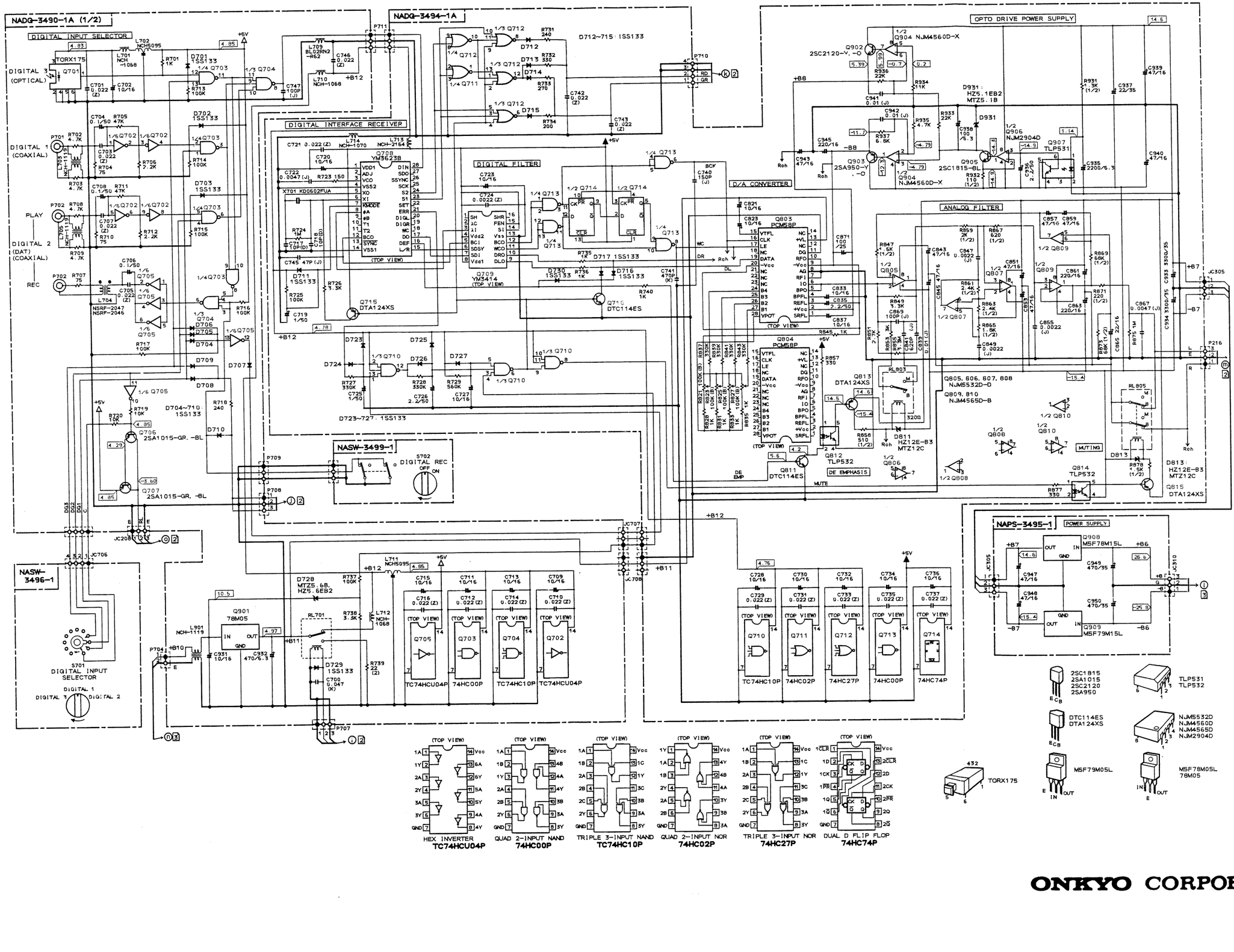
SYSTEM CONNECTIONS



BLOCK DIAGRAM (II)



SCHEMATIC DIAGRAM (1/3)



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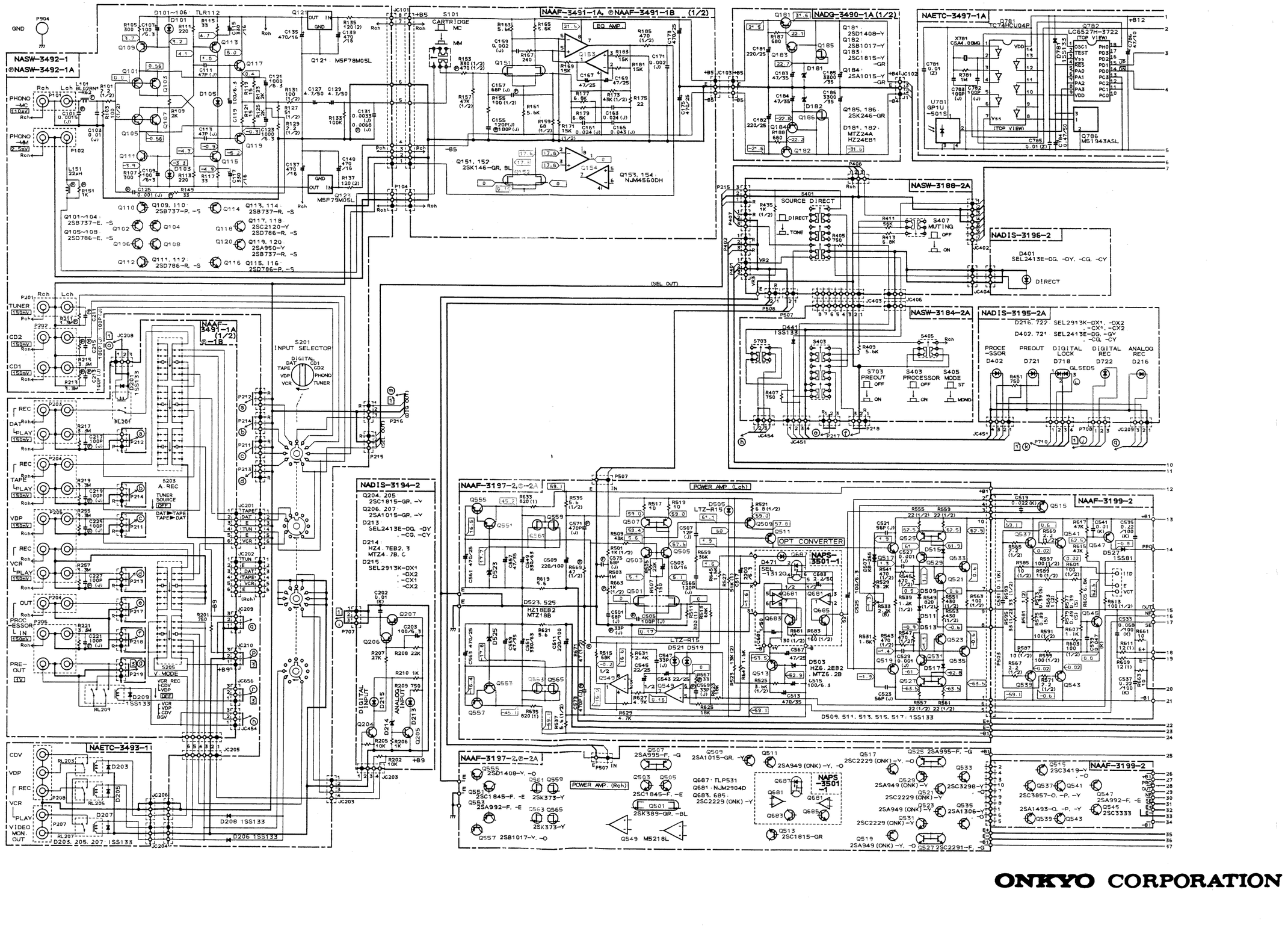
SCHEMATIC DIAGRAM (2/3)



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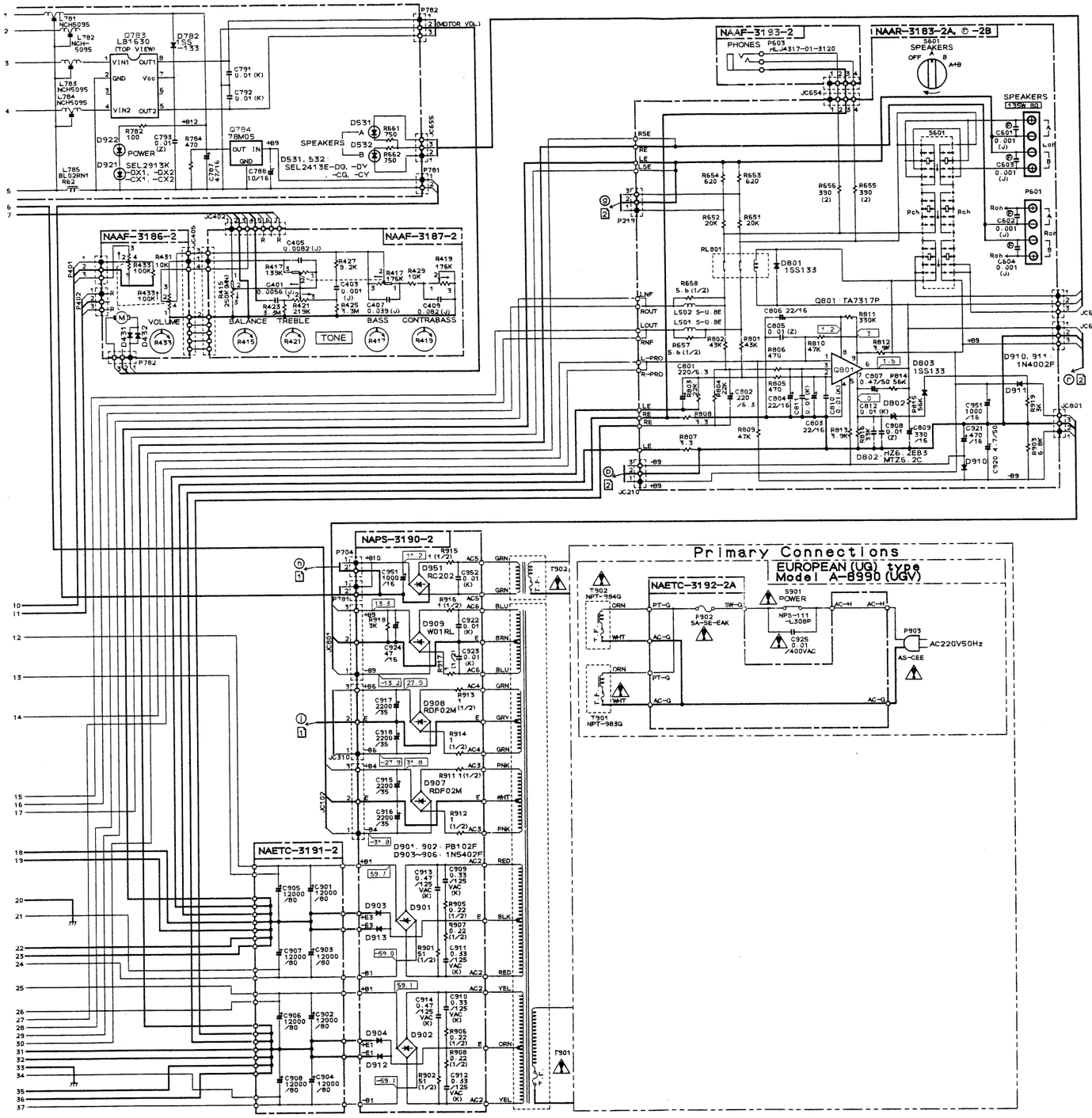
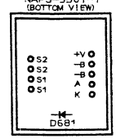
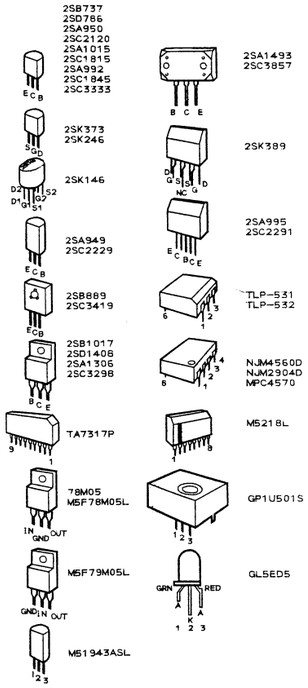
SCHEMATIC DIAGRAM (3/3)







-NOTES-

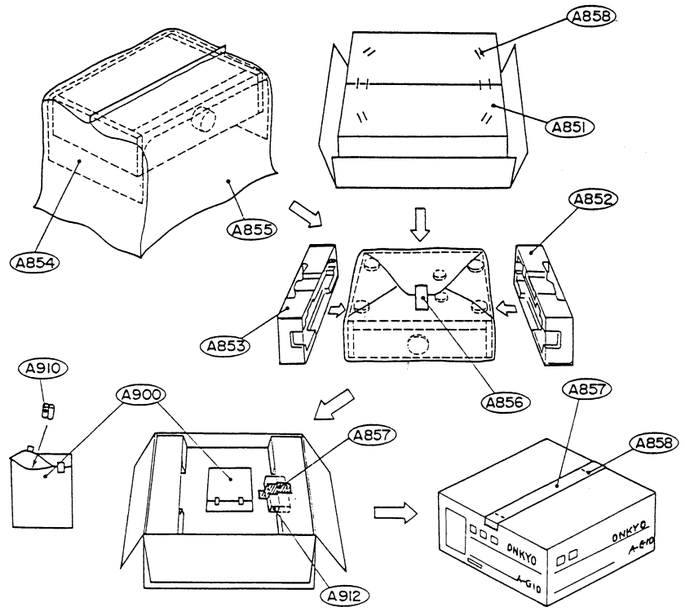
- ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED
- ALL CAPACITORS ARE IN μF/50V UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (—||—) ARE IN μF/WV
- ALL DIODES ARE 1SS133 UNLESS OTHERWISE NOTED.
- ALL PNP TRANSISTORS ARE 2SA1015-GR or 2SA733-P UNLESS OTHERWISE NOTED.
- ALL NPN TRANSISTORS ARE 2SC1815-GR or 2SC945A-P UNLESS OTHERWISE NOTED.
- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED
- VOLTAGE MEASURED WITH V.T.V.M. (▷) IS DC VOLTAGE (NO INPUT SIGNAL).
- THE COMPONENTS IDENTIFIED BY MARK Ⓓ ARE USED ONLY IN UGV TYPE
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

TOLERANCE CHART

(C)	(D)	(G)	(J)	(K)	(M)	(Z)
±0.25 pF	±0.5 pF	±2%	±5%	±10%	±20%	+80% −20%

A-8990

PACKING PROCEDURES



REF. NO.	PART NO.	DESCRIPTION
A851	29051847	MASTER CARTON BOX
A852	29091243	PAD ASS'Y, LEFT
A853	29091244	PAD ASS'Y, RIGHT
A854	29095508	600×1300, PROTECTION SHEET
A855	29100038A	720×950, POLY-VINYL BAG
A856	261504	PAPER TAPE
A857	260012	(80 mm) DAMPLON TAPE
A858	282301	SEALING HOOK
	29355150	CAUTION (SHORT PIN)
	29355133	CAUTION (DBP)
A900	**ACCESSARY BAG ASS'Y**	
	29341367	INSTRUCTION MANUAL
	29365020	WARRANTY CARD
	29100094A	POLY-VINYL BAG

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